VRF SYSTEM OUTDOOR UNIT

AJ□A72LALH AJ□126LALH
AJ□A90LALH AJ□144LALH
AJ□108LALH

⚠CAUTION

R410A
REFRIGERANT

This Air Conditioner contains and operates with refrigerant R410A.

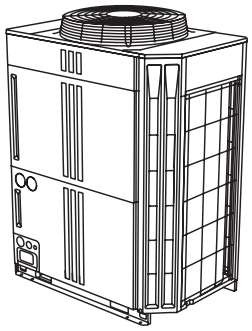
THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

English

INSTALLATION MANUAL

For authorized service personnel only.



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PART NO. 9378945029-03

1. SAFETY PRECAUTIONS

- Be sure to read this Installation manual thoroughly before installation.
- The warnings and precautions indicated in this Installation manual contain important information pertaining to your safety. Be sure to observe them.
- After installing the unit, perform a test run to make sure the unit operates normally. Then, explain to the customer how to operate and maintain the unit.
- Please pass this Installation manual together with the Operating manual to the customer.
  Please ask the customer to keep the Operating manual and Installation manual at hand for future reference during the moving or repair of the main unit.

⚠ WARNING!	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.

- Consult the retail store or professional technicians to install the main unit according to the Installation manual.
  Improper installation will cause serious accidents such as refrigerant leakage, water leakage, electric shock, and fire.
  Manufacturer's guarantee will be invalid when instructions in the Installation manual are ignored during installation.
- For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts.
  Using non-specified parts will cause serious accidents such as falling unit, refrigerant leakage, water leakage, electric shock, and fire.
- To install a unit that uses the R410A refrigerant, use dedicated tools and piping materials that have been manufactured specifically for R410A use.
  Because the pressure of the R410A refrigerant is approximately 1.6 times higher than the R22, failure to use dedicated piping material or improper installation can cause rupture or injury.
  It will also cause serious accidents such as refrigerant leakage, water leakage, electric shock, and fire.
- Do not introduce any substance other than the prescribed refrigerant into the refrigeration cycle.
  If air enters the refrigeration cycle, the pressure in the refrigeration cycle will become abnormally high and cause the piping to rupture.
- Be sure to install the unit as prescribed, so that it can withstand earthquakes and typhoons or other strong winds.
  Improper installation can cause the unit to topple or fall, or other accidents.
- Ensure that the outdoor unit is securely installed at a place that can withstand the weight of the unit.
  Improper installation will cause injuries caused by falling unit.
- If there is a refrigerant leakage, make sure that it does not exceed the concentration limit.
  If a refrigerant leakage exceeds the concentration limit, it can lead to accidents such as oxygen starvation.
- If a refrigerant leakage occurs during operation, immediately vacate the premises and thoroughly ventilate the area.
  If the refrigerant is exposed to fire, it will create a hazardous gas.
- Electrical work must be performed in accordance with this Installation manual by a person certified under the national or regional regulations. Be sure to use a dedicated circuit for the unit.
  An insufficient power supply circuit or improperly performed electrical work can cause serious accidents such as electric shock or fire.
- For wiring, use the prescribed type of wires, connect them securely, making sure that there are no external forces of the wires applied to the terminal connections.
  Improperly connected or secured wires can cause serious accidents such as overheating the terminals, electric shock, or fire.
- Securely install the electrical box cover on the unit.
  An improperly installed electrical box cover can cause serious accidents such as electric shock or fire through exposure to dust or water.
- Do not turn ON the power until all work has been completed.
  Turning ON the power before the work is completed can cause serious accidents such as electric shock or fire.
- After the installation, make sure there is no refrigerant leakage.
  If the refrigerant leaks into the room and becomes exposed to a source of fire such as a fan heater, stove, or burner, it will create a hazardous gas.
- Use a wall hole pipe. Otherwise, it may cause a short circuit.

- Do not place the outdoor unit near the handrail of the balcony.
  Children may climb onto the outdoor unit, lean over the handrail and fall over.
- Use only a specified power cable. Poor connection, poor insulation, and exceeding the allowable current will lead to electric shock and fire.
- Attach the connecting cables securely to the terminal. Or secure it firmly with a "wiring suppressor".
  Loose connection will lead to malfunction, electric shock, and fire.
- Install a breaker (earth leakage breaker) to cut off all AC main current at the same time.
  If you do not install a breaker (earth leakage breaker), it may cause electric shock and fire.
- Be sure to install the refrigerant pipe before operating the compressor. If the refrigerant pipe is not installed and you operate the compressor while the valve is open, air will be sucked into the system and abnormal pressure will occur in the cooling cycle. This will damage the unit and cause injuries.
- During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

⚠ CAUTION!	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

- Obtain the distribution network operator's agreement about the power capacity of the power supply system, specification of the cable and the harmonic current, and etc. when you connect the outdoor unit with the power supply.
- This unit must be connected to a power supply with impedance of 0.33 ohm and below. If the power supply does not satisfy this requirement, please consult the power supplier.
- This product is intended for professional use.
  Be sure to use a dedicated power circuit.
  Never use a power supply shared by another appliance.
- Do not install the unit in the following areas:
  - Area with high salt content, such as at the seaside.
    It will deteriorate metal parts, causing the parts to fall or the unit to leak water.
  - Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen.
    It will deteriorate plastic parts, causing the parts to fall or the unit to leak water.
  - Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali.
    It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
  - Area containing equipment that generates electromagnetic interference.
    It will cause the control system to malfunction, preventing the unit from operating normally.
  - Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline.
    If gas leaks and settles around the unit, it can cause a fire.
  - Avoid installing the unit at places where it will come into contact with animals' urine or ammonia.
- Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects. It can degrade the quality of the preserved or stored objects.
- Ground the unit. Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or a telephone ground wire. Improper grounding may cause electric shock.
- Perform draining for the unit according to the Installation manual. Check that the water is properly drained.
  If the drain processing is improperly installed, water may drip down from the unit, wetting the furniture.
- Do not touch the fins with bare hands.
- Be sure not to start or stop the operation of air conditioning with power breaker. Otherwise, it may cause malfunction or water leakage.
- When setting it up near the equipment that generates electromagnetic waves and the equipment that generates the higher harmonics wave, be sure to take measures against noise. Otherwise, it may cause malfunction or failure.
- When energizing to the crankcase heater, please turn on the power 12 hours or earlier before operation begins. When the energizing time is short, it may cause failure. Besides, please do not turn off power during the busy season.

2. ABOUT THE PRODUCT

2. 1. Caution when using R410A refrigerant

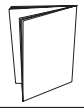
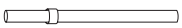
Pay careful attention to the following points :
• Since the working pressure is 1.6 times higher than that of R22 models, some of the piping and installation and service tools are special. (See the table in the SPECIAL TOOLS FOR R410A section.) Especially, when replacing a conventional refrigerant (other than R410A) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
• Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with R22, R407C and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]
• Be more careful than the installation of the refrigerant (other than R410A) models, not to enter foreign matters (oil, water, etc.) and other refrigerant into the piping. Also, when storing the piping, securely seal the openings by pinching, taping, etc.
• When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

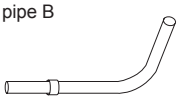
2. 2. Special tools for R410A

Tool name	Contents of change for R22 tool
Gauge manifold	Pressure is huge and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended to use a gauge manifold with a high pressure display range -0.1 to 5.3 MPa and a low pressure display range -0.1 to 3.8 MPa.
Charging hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter. • A conventional vacuum pump can be used by installing a vacuum pump adapter. • Be sure that the pump oil does not back flow into the system. Use one capable for vacuum suction of -100.7kPa (5 Ton, -755mmHg).
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

2. 3. Accessories

Use connecting parts as required.
Do not throw away the connecting parts until the installation has been complete.

Name and shape	Q'ty	Application
Specifications manual	1	—
Installation manual 	1	(This book)
Joint pipe A 	1	For connecting gas pipe (Straight type)

Name and shape	Q'ty	Application
Joint pipe B 	1	For connecting gas pipe (L type)
Binder	9	For binding power cable and transmission cable

2. 4. Combinations

A maximum of 3 outdoor units can be connected to 1 refrigerant system.
The combination of outdoor units per refrigerant system and the number of indoor units that can be connected are as follows:

Outdoor Unit	
Model Name	Nominal System Capacity (HP)
AJ□A72LALH	8
AJ□A90LALH	10
AJ□108LALH	12
AJ□126LALH	14
AJ□144LALH	16

Installation space combination

Combination (HP)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
Outdoor Unit 1 (HP)	8	10	12	14	16	10	12	12	12	14	16	16	16	12	12	14	16	16	16	16	16
Outdoor Unit 2 (HP)	-	-	-	-	-	8	8	10	12	12	12	14	16	12	12	12	12	14	16	16	16
Outdoor Unit 3 (HP)	-	-	-	-	-	-	-	-	-	-	-	-	-	10	12	12	12	12	12	14	16
Maximum Connectable Indoor Unit	15	16	17	21	24	32	32	32	35	39	42	45	48	48	48	48	48	48	48	48	48

When connecting outdoor units, install the outdoor unit with the largest nominal system capacity nearest to the refrigerant pipe and indoor unit, followed by those with lesser nominal system capacities. (Outdoor unit 1≧Outdoor unit 2≧Outdoor unit 3)

Energy-saving combination

Combination (HP)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
Outdoor Unit 1 (HP)	-	-	-	-	8	-	-	14	8	10	12	14	12	14	14	-	14	14	16	-	-
Outdoor Unit 2 (HP)	-	-	-	-	8	-	-	8	8	8	8	8	12	12	14	-	14	14	14	-	-
Outdoor Unit 3 (HP)	-	-	-	-	-	-	-	-	8	8	8	8	8	8	8	-	12	14	14	-	-
Maximum Connectable Indoor Unit	*	*	*	*	30	*	*	33	36	39	42	45	48	48	48	*	48	48	48	*	*

* Means that the energy-saving combination is unavailable.

When connecting outdoor units, install the outdoor unit with the largest nominal system capacity nearest to the refrigerant pipe and indoor unit, followed by those with lesser nominal system capacities. (Outdoor unit 1≧Outdoor unit 2≧Outdoor unit 3)

2. 5. Option parts

⚠ CAUTION

The following parts are optional parts specific to R410A refrigerant.
Do not use parts other than those listed below.

2. 5. 1. Separation tube kit

Table A indicates the separation tube to be used when installing multiple outdoor units.
Table B indicates the separation tube to be used for connecting the outdoor and indoor units.
Refer to the installation instruction sheet for the outdoor unit branch kit and the separation tubes for installation specifications.

Table. A Separation tube for installing multiple outdoor units

Separation tube	Total cooling capacity of indoor unit (kW)
UTR-CP567X	ALL

Table. B Selection of separation tubes

Separation tube	Total cooling capacity of indoor unit (kW)
UTR-BP090X	28.0 or less
UTR-BP180X	28.1 to 56.0
UTR-BP567X	56.1 or more

2. 6. Header

A header is used for connecting the indoor units. Refer to the installation instruction sheet for the header for installation specifications.

Table. C Selection of header

Header		Total cooling capacity of indoor unit (kW)
3-6 Branches	3-8 Branches	
UTR-H0906L	UTR-H0908L	28.0 or less
UTR-H1806L	UTR-H1808L	28.1 to 56.0

3. INSTALLATION WORK

Please obtain the approval of the customer when selecting the location of installation and installing the main unit.

3. 1. Selecting an installation location

⚠ WARNING

- Install the unit in a location that can withstand its weight, and where it will not topple or fall.
- Calculate the proper refrigerant concentration if you will be installing it in an enclosed location.

$$\frac{\text{Total amount of replenished refrigerant in refrigerant facility (kg)}}{\text{Capacity of smallest room where unit is installed (m}^3\text{)}} \leqq \text{Refrigerant concentration (kg/m}^3\text{)} \quad (0.3\text{kg/m}^3)$$

- If the results of the calculation exceed the concentration limit, increase the room surface area or install a ventilation duct.

⚠ CAUTION

Select an installation location by observing the following precautions:

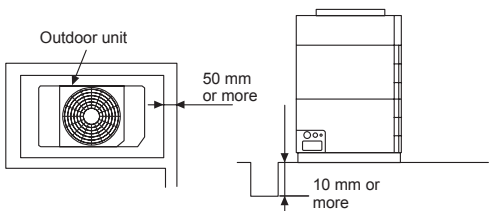
- Install the unit horizontally. (within 3 degrees)
- Install this unit in a location with good ventilation.
- If the unit must be installed in an area within easy reach of the general public, install as necessary a protective fence or the like to prevent their access.
- Install the unit in an area that would not inconvenience your neighbors, as they could be affected by the airflow coming out from the outlet, noise, or vibration.
  If it must be installed in proximity to your neighbors, be sure to obtain their approval.
- If the unit is installed in a cold region that is affected by snow accumulation, snow fall, or freezing, take appropriate measures to protect it from those elements.
  To ensure a stable operation, install inlet and outlet ducts.
- Install the unit in an area that would not cause problems even if the drain water is discharged from the unit. Otherwise, provide drainage that would not affect people or objects.
- Install the unit in an area that has no heat sources, vapors, or the risk of the leakage of flammable gas in the vicinity.
- Install the unit in an area that is away from the exhaust or vent ports that discharge vapor, soot, dust, or debris.
- Install the indoor unit, outdoor unit, power supply cable, transmission cable and remote control cable at least 1 meter away from a television or radio.
  The purpose of this is to prevent TV reception interference or radio noise. (Even if they are installed more than 1 meter apart, you could still receive noise under some signal conditions.)
- Keep the length of the piping of the indoor and outdoor units within the allowable range.
- For maintenance purposes, do not bury the piping.

3. 2. Drain processing

- The drain water is discharged from the bottom of the equipment. Construct a drain ditch around the base and discharge the drain water properly.
- When installing on a roof, perform floor waterproofing properly.

Drain processing:

- The drain water from the base of the outdoor unit may generate during operations.
  Perform drain processing, as necessary.
- When you want to prevent the drain water from leaking at the perimeter, construct a ditch for the drain water as shown in the figure.
- Provide a central drain pan, as necessary.



3. 3. Installation dimensions

⚠ CAUTION
When installing the outdoor unit, pay attention to the following items.
• Provide sufficient installation space, such as transportation route, maintenance space, ventilation space, refrigerant piping space, and passageways.
• Pay attention to the specifications of the installation space as shown in the figure. If the unit is not installed according to specifications, it may cause short circuit or poor performance. The unit may be prone to lapse into non-operation due to high pressure protection.
• Do not place obstructions in the air flow outlet direction. If there is an obstruction in the outlet direction, install an outlet duct.
• When there is a wall in front of the unit, provide a space of 500mm or more as maintenance space. • When there is a wall at the left side of the unit, provide a space of 30mm or more as maintenance space.
• An outdoor temperature of 35 degrees in air-conditioned operation is assumed for the installation space in this item. If the outdoor temperature exceeds 35 degrees and the outdoor unit is operating at a load exceeding its rated ability, provide a larger inlet space.
• If you are installing more outdoor units than indicated here, please ensure sufficient space or consult your distributing agent as it may affect the performance due to short circuit and other problems.

3. 3. 1. When install near by limited height wall

(1) Single and multiple installations

- There are no restrictions on the height of the side wall.
- Provide installation spaces L1 and L2 in accordance with the table below according to the wall height (front side, rear side) conditions.
- Provide installation spaces other than L1 and L2 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

Wall height condition	Necessary installation space
When H1 is 1500 (mm) or less	L1≧500 (mm)
When H1 is 1500 (mm) or more	L1≧500+h1÷2 (mm)
When H2 is 500 (mm) or less	L2≧100 (mm)
When H2 is 500 (mm) or more	L2≧100+h2÷2 (mm)

Fig. 1

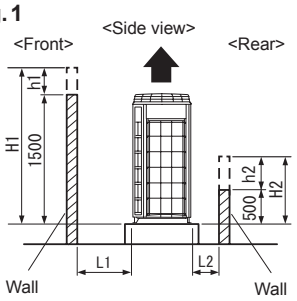


Fig. 2 Single installation

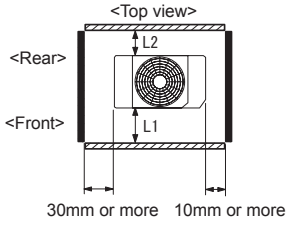
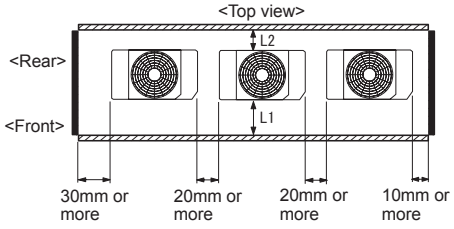


Fig. 3 Multiple installations



(2) Concentrated installation

- Provide installation spaces L3, L4, and L5 in accordance with the table below according to the wall height (front side, rear side) conditions.
- Provide installation spaces other than L3, L4, and L5 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

Wall height condition	Necessary installation space
When H3 is 1500 (mm) or less	L3≧500 (mm)
When H3 is 1500 (mm) or more	L3≧500+h3÷2 (mm)
When H4 is 500 (mm) or less	L4≧200 (mm)
When H4 is 500 (mm) or more	L4≧200+h4÷2 (mm)
When H5 is 500 (mm) or less	L5≧200 (mm)
When H5 is 500 (mm) or more	L5≧200+h5÷2 (mm)

Fig. 4

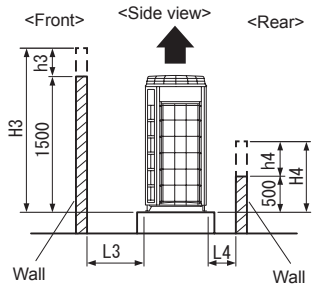


Fig. 5

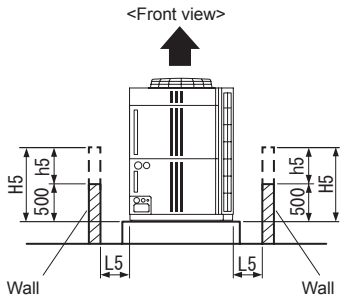


Fig. 6

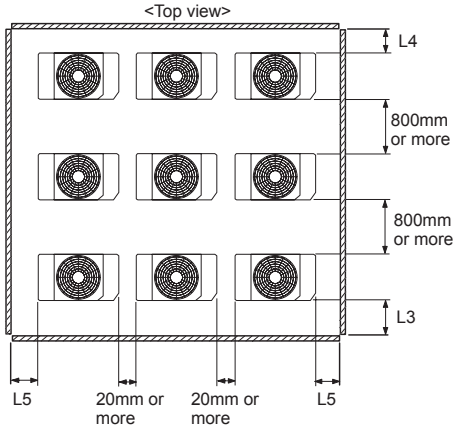
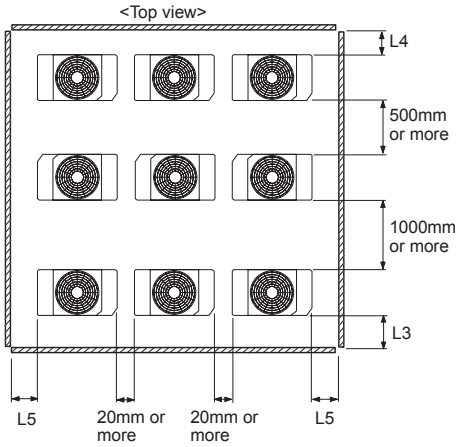


Fig. 7



3. 3. 2. When install near by unlimited height wall

(1) Single and multiple installations

- There are no restrictions on the height of the wall.
- The wall (without height restrictions) must not exist on the both sides (left / right) of outdoor unit. Also, must not exist on the both sides (front / rear) of outdoor unit.
- Provide installation spaces other than L6 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

When installing with the REAR of the outdoor unit facing the wall side

Condition	Necessary installation space
When B≧400 (mm)	L6≧200 (mm)
When 20≦B < 400 (mm)	L6≧200 + (400-B) ×3 (mm)

Fig. 8 Single installation

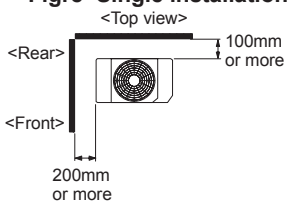
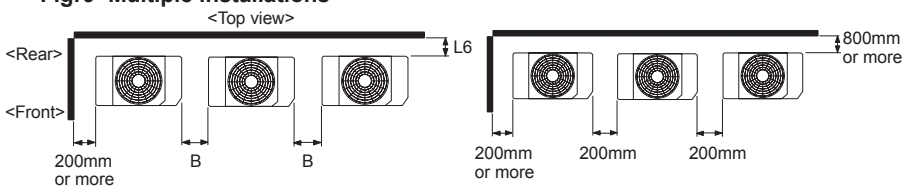


Fig. 9 Multiple installations



Example :
When B is made 200mm
L6≧200+(400-200)×3=800mm

When installing with the FRONT of the outdoor unit facing the wall side

Fig. 10

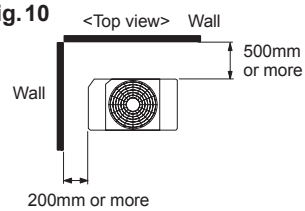
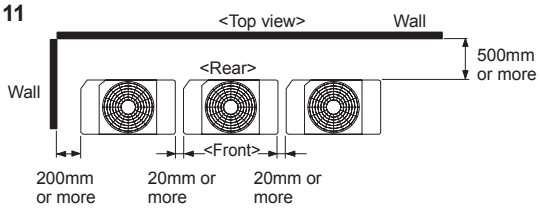


Fig. 11



(2) Concentrated Installation

- The wall (without height restrictions) must not exist on the both sides (left / right) of outdoor unit. Also, must not exist on the both sides (front / rear) of outdoor unit.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

Fig. 12

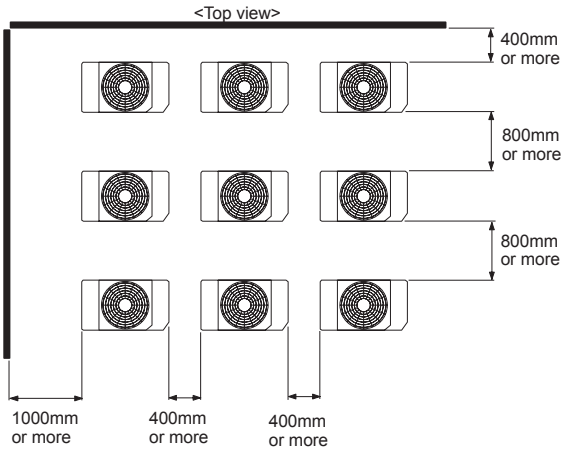
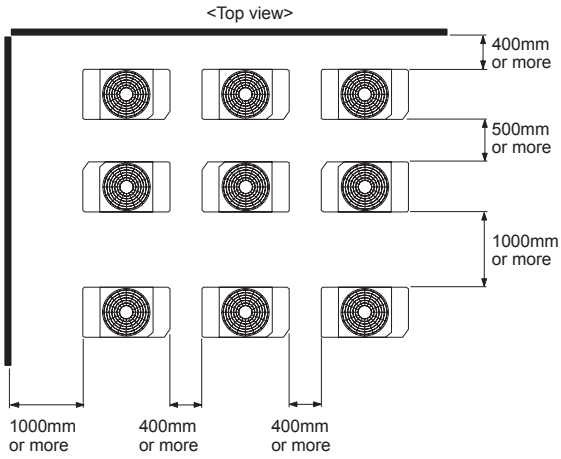
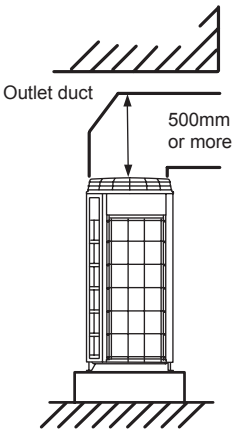


Fig. 13



3. 3. 3. When there are obstacles above the product

When there are obstacles above the product, keep the minimum installation height as shown in the figure and install the outlet duct.
When installing the outlet duct, you must set the high static pressure mode with the push-button switch.
(Similar when installing anti-snow hood)



Setting high static pressure mode

Follow the instructions in the table below to set the high static pressure mode.

Condition	High static pressure mode setting *2
Static Pressure(SP) *1 : 0 ≤ SP ≤ 30 (Pa)	Set to Mode 1
Static Pressure(SP) *1 : 30 < SP ≤ 80 (Pa)	Set to Mode 2

*1. Static pressure is the air flow resistance that includes the discharge duct resistance & the other additional resistance like discharge grill and so on.
*2. Refer to the section on Push Switch Setting in “Chapter 7 Field Setting”.

3. 4. Transportation the outdoor unit

Hoisting method (Fig. A)

- When hanging the outdoor unit and conveying it to installation location, hang the unit with rope by passing through the 4 opening holes on bottom of front and rear side as shown in figure.
- Use 2 ropes at least 8m long. If used shorter length, it may cause to damage the unit.
- Use the sufficiently strong rope to bear the unit’s weight.
- Place the protective board or filler cloth at the place where the cabinet may come into contact with rope to prevent from damages. Without using them, cabinet may cause to damage or deform.
- During the hanging unit, make sure to keep the unit horizontally to prevent the drop.
- Be careful not to shock the impacts during the hanging.

Conveying by forklift (Fig.B)

- When using the forklift to convey the unit, pass the forklift arms through the opening space as shown in below.
  Front : Bottom of the wooden delivery pallet.
  Side : Space between pallet and cabinet.
- Enable to remove the pallet from cabinet.
- Be careful not to be damaged.

Conveying by forklift (Manual forklift: hand-fork)

- When using the manual forklift to convey the unit, pass the forklift arms through the opening space between pallet and cabinet from side.

Fig. A

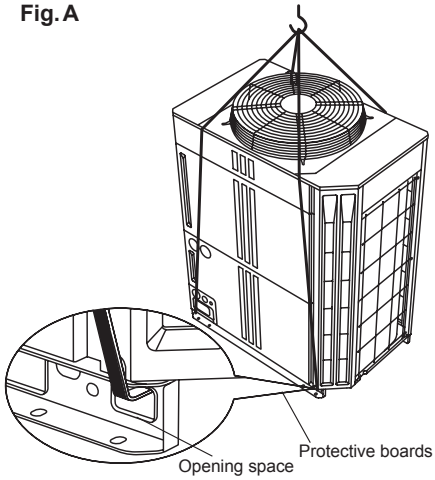
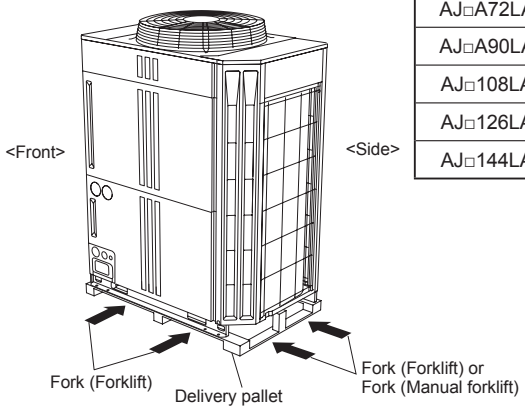


Fig. B



Product mass (kg)	
AJ□A72LALH	220
AJ□A90LALH	220
AJ□108LALH	275
AJ□126LALH	303
AJ□144LALH	303

3. 5. Installation the unit

- Install the unit horizontally. (within 3 degrees).
- Install 4 or more anchor bolts at the 8 locations indicated by arrows (Fig. A).
- Place the left and right anchor bolts at a distance further away than the dimensions of A in the Table A.
  (Excluding the case where anchor bolts are installed at 8 locations.)
- To minimize vibration, do not install the outdoor unit directly on the ground.
  Instead, install it on top of a firm platform (such as concrete block). (Fig. B)
- The foundation base should be able to support the product and the foot width of the product should be more than 46.5mm.
- Depending on the installation condition, vibration during the operation of the unit may cause noise and vibration.
  Install vibration-proofing materials (such as rubber pads).
- Consider the removal space of the connection piping when installing the foundation.
- Secure the equipment firmly with anchor bolts, washers, and nuts.

Fig. A (Unit:mm)

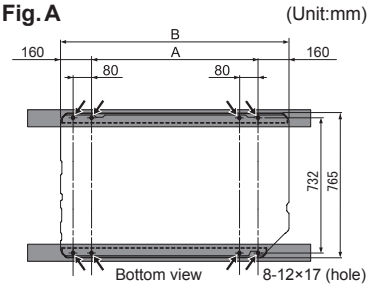
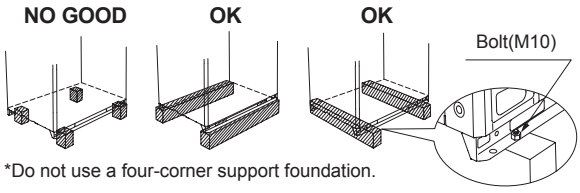


Table. A

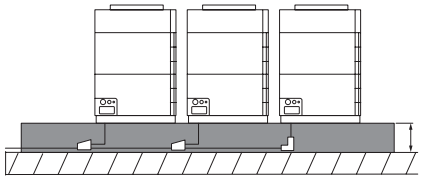
Model name	A	B
AJ□A72LALH	610	930
AJ□A90LALH	610	930
AJ□108LALH	610	930
AJ□126LALH	920	1240
AJ□144LALH	920	1240

Fig. B



*Do not use a four-corner support foundation.

Fig. C



When installing piping from the bottom of the outdoor units, the required space under the outdoor unit ≧ 200mm.

*Install the branch kit horizontally.

4. SYSTEM CONFIGURATION

4. 1. System configuration

⚠ CAUTION

- When connecting multiple outdoor units, set the nearest outdoor unit to the indoor unit on the refrigerant pipe as the master unit.
- When connecting multiple outdoor units, install the outdoor unit with the largest nominal system capacity nearest to the indoor unit and on the refrigerant pipe, followed by those with less nominal system capacities.
- Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant when charging will lead to malfunction.

A) In case of 1 outdoor unit connected
- From outdoor unit to the farthest indoor unit:
  a+f≦150m, a+p≦150m (actual pipe length)
- From the first separation tube to the farthest indoor unit:
  f≦60m, p≦60m (actual pipe length)
- Difference in height between outdoor units and indoor units (H1)
  50m: For the indoor unit stated below
  40m: For the outdoor unit stated below
- Difference in height between indoor units and indoor units
  H2≦15m, H3≦15m
- Total pipe length
  a+f+h+j+l+n+p+q+s+u≦700m
- Total refrigerant amount≦31.5kg

B) In case of 2 outdoor unit connected
- From outdoor unit to the farthest indoor unit:
  a+e+f≦150m, a+e+p≦150m (actual pipe length)
- Difference in height between outdoor units and indoor units (H1)
  50m: For the indoor unit stated below
  40m: For the outdoor unit stated below
- From the first separation tube to the farthest indoor unit
  f≦60m, p≦60m (actual pipe length)
- Difference in height between indoor units and indoor units (H2, H3)
  H2≦15m, H3≦15m
- Difference in height between outdoor unit and outdoor units (H4)
  H4≦0.5m
- From outdoor unit to outdoor unit branch kit
  a≦3m, b≦3m
- Total pipe length
  a+b+e+f+h+j+l+n+p+q+s+u≦1000m
- Total refrigerant amount≦63kg
- Outdoor unit capacity
  Master≧slave

C) In the case of 3 outdoor units connected
- From outdoor unit to the farthest indoor unit:
  a+e+f≦150m, a+e+p≦150m (actual pipe length)
- From the first separation tube to the farthest indoor unit:
  f≦60m, p≦60m (actual pipe length)
- Difference in height between outdoor units and indoor units (H1)
  50m: For the indoor unit stated below
  40m: For the outdoor unit stated below
- Difference in height between indoor units and indoor units (H2,H3)
  H2≦15m, H3≦15m
- Difference in height between outdoor unit and outdoor units (H4)
  H4≦0.5m
- From outdoor unit to outdoor unit branch kit
  a≦3m, b≦3m, c≦3m
- Between the farthest outdoor unit to the first outdoor unit branch kit
  b+d≦12m, c+d≦12m
- Total pipe length
  a+b+c+d+e+f+h+j+l+n+p+q+s+u≦1000m
- Total refrigerant amount ≦94.5kg
- Outdoor unit capacity
  Master≧slave 1≧slave 2

NOTE) • If the outdoor temperature during cooling operation is expected to be –5 °C or less, do not install the outdoor unit lower than the indoor unit.
・Please refer to “8.3.2. Checking total amount of refrigerant and calculating the amount of refrigerant charge to be added” for the total amount of refrigerant.

Fig. A

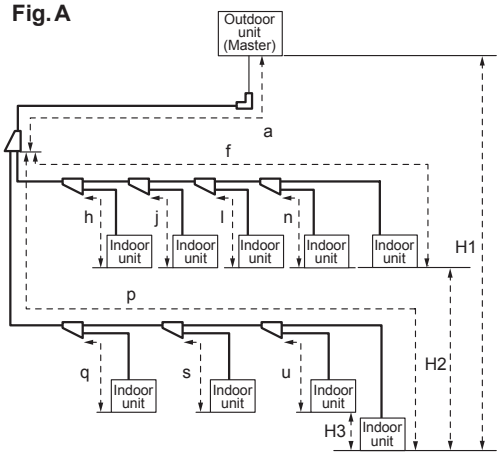


Fig. B

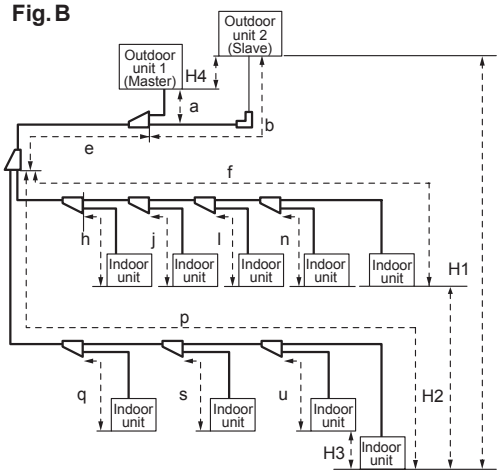
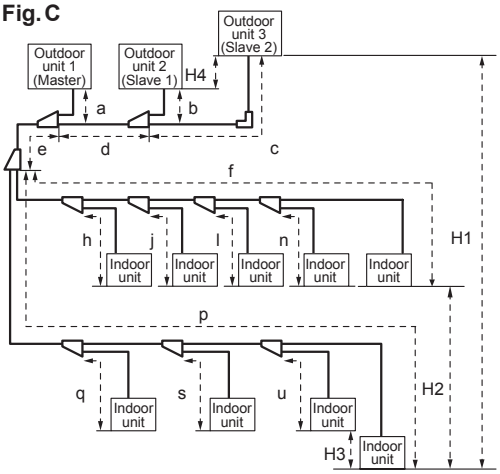


Fig. C



4. 2. Pipe selection

⚠ CAUTION

- This unit is designed specifically for use with the R410A refrigerant.
- Pipes for R407C or R22 may not be used with this unit.
- Do not use existing pipes.
- Improper pipe selection will degrade performance.

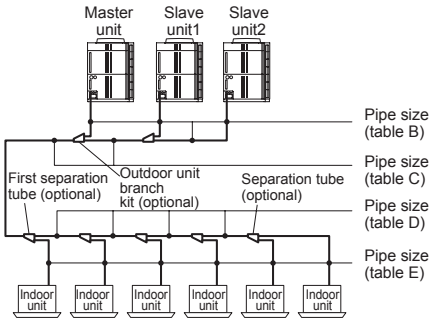


Table. A (Wall thickness and pipe material for each diameter)

Outside Diameter	mm	6.35	9.52	12.70	15.88	19.05	22.22	28.58	34.92	41.27
Wall Thickness[*3]	mm	0.8	0.8	0.8	1.0	1.2	1.0	1.0	1.2	1.43
Material		COPPER[*1] JIS H3300 C1220T-O or equivalent					COPPER[*2] JIS H 3300 C1220T-H or equivalent			

Please select the pipe size in accordance with local rules.

Table. B (Between outdoor unit to outdoor unit branch kit)

HP	Outdoor unit cooling capacity (kW)	Outside diameter (mm)		Branch kit[*4]
		Liquid pipe	Gas pipe	
8	22.4	12.70	22.22	UTR-CP567X
10	28.0	12.70	22.22	
12	33.5	12.70	28.58	
14	40.0	12.70	28.58	
16	45.0	12.70	28.58	

*1. Allowable tensile stress ≧ 33 (N/mm2)
*2. Allowable tensile stress ≧ 61 (N/mm2)
*3. Endurance pressure of the pipes 4.2MPa
*4. For the installation method, refer to “5.4. Multiple connections”.

Table. C (Between outdoor unit branch kits or outdoor unit branch kit to first separation tube)

Total cooling capacity of outdoor unit (kW)	Outside diameter (mm)	
	Liquid pipe	Gas pipe
22.4 to 28.0	12.70	22.22
28.1 to 45.0	12.70	28.58
45.1 to 56.0	15.88	28.58
56.1 to 80.0	15.88	34.92
80.1 to 96.0	19.05	34.92
96.1 or more	19.05	41.27

If the pipe diameter between separation tubes (based on Table D) is larger than the pipe diameter between outdoor unit branch kit and the first separation tube (based on Table C), select the pipe whose diameter is equal to the one between the outdoor unit branch kit and the first separation tube.
(If pipe diameter D > C, select pipe size from table C)

Use a standard separation tube for pipe branching. Do not use a T tube as it does not separate the refrigerant evenly.

Table. D (Between separation tubes)

Total cooling capacity of indoor unit (kW)	Outside diameter (mm)	
	Liquid pipe	Gas pipe
4.4 to 11.1	9.52	15.88
11.2 to 13.9	9.52	19.05
14.0 to 28.0	12.70	22.22
28.1 to 44.7	12.70	28.58
44.8 to 56.0	15.88	28.58
56.1 to 80.0	15.88	34.92
80.1 to 95.0	19.05	34.92
95.1 or more	19.05	41.27

Table. E (Between separation tube to indoor unit)

Cooling capacity of indoor unit (kW)	Outside diameter (mm)	
	Liquid pipe	Gas pipe
2.2, 2.8, 3.6, 4.0, 4.5	6.35	12.70
5.6, 7.1, 8.0, 9.0	9.52	15.88
11.2, 12.5, 14.0, 18.0		19.05
22.4, 25.0	12.70	22.22

Table. F (Separation tube / Header)

Total cooling capacity of indoor unit (kW)	Separation tube *5	Header *5	
		3-6 Branches	3-8 Branches
28.0 or less	UTR-BP090X	UTR-H0906L	UTR-H0908L
28.1 to 56.0	UTR-BP180X	UTR-H1806L	UTR-H1808L
56.1 or more	UTR-BP567X	—	—

*5. For the installation method, refer to the installation manuals for indoor unit piping connection, separation tubes, and header.

4. 3. Protection of pipes

Location	Working period	Protection method
Outdoor	1 month or more	Pinch pipes
	Less than 1 month	Pinch or tape pipes
Indoor	—	Pinch or tape pipes

- Protect the pipes to prevent the entry of moisture and dust.
- Especially pay attention when passing the pipes through a hole or connecting the end of a pipe to the outdoor unit.

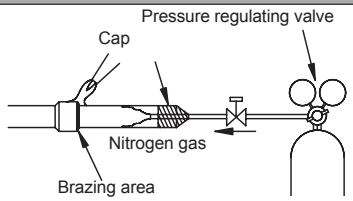
5. PIPE INSTALLATION

5. 1. Brazing

⚠ CAUTION

- If air or another type of refrigerant enters the refrigeration cycle, the internal pressure in the refrigeration cycle will become abnormally high and prevent the unit from exerting its full performance.

Fig.

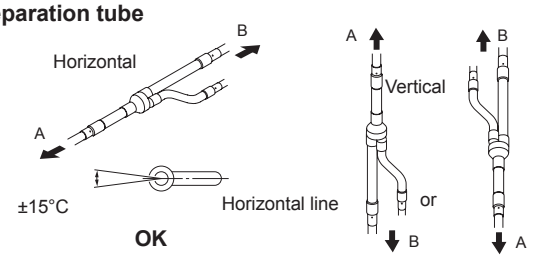


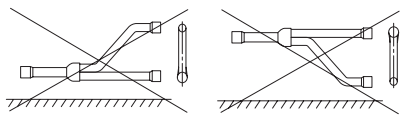
- Apply nitrogen gas while brazing the pipes.
  Nitrogen gas pressure: 0.02 MPa (= pressure felt sufficiently on the back of your hand)
- If a pipe is brazed without applying nitrogen gas, it will create an oxidation film.
  This can degrade performance or damage the parts in the unit (such as the compressor or valves).
- Do not use flux to braze pipes. If the flux is the chlorine type, it will cause the pipes to corrode.
  In addition, if the flux contains fluoride, it will affect the refrigerant piping system due to deterioration of refrigerant oil.
- For brazing material, use phosphor copper that does not require flux.

5. 2. Indoor unit pipe connections

⚠ CAUTION

Separation tube

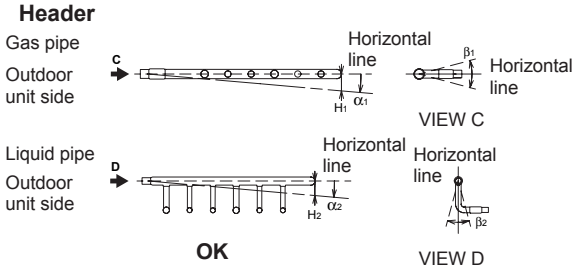




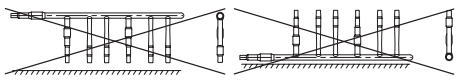
NO GOOD

A : Outdoor unit or Refrigerant branch kit
B : Indoor unit or Refrigerant branch kit

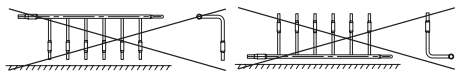
Header



H_1 = 0 mm – 10 mm
(α_1 : 0° – 1°)
β_1: -10° – 10°

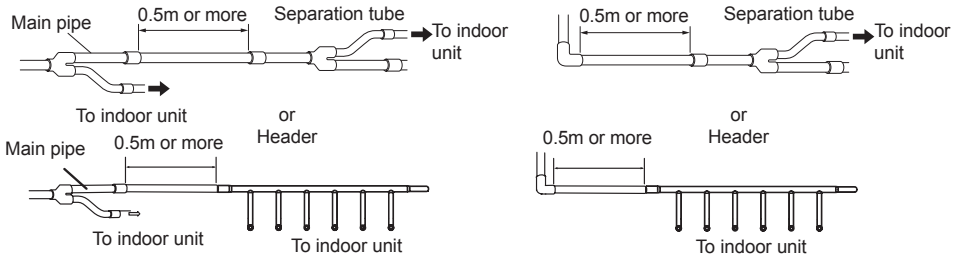


H_2 = 0 mm – 10 mm
(α_2 : 0° – 1°)
β_2: -10° – 10°



NO GOOD NO GOOD

⚠ CAUTION



- Do not connect a separation tube after a header.
- Leave the distance 0.5 m or more for straight part to branch tube and header.

- For details, refer to the Installation Instruction Sheet of each part.

5. 3. Piping method

5. 3. 1. Opening the knockout hole

⚠ CAUTION

- Be careful to prevent panel deformed or damaged while opening the knockout hole.

- To prevent cutting of the wiring after the knockout hole was opened, remove the burrs along the edge.
- In addition, to prevent rusting, painting the edge with rust preventive paint is recommended.

The piping can be connected from 2 directions; the front or the bottom.
(Knockout holes are provided so that the piping can be connected from 2 different directions.)
Use the front knockout hole, as required.

Fig. A Knockout position

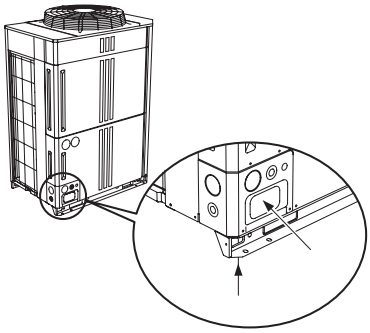


Fig. B Detail of knockout position (bottom)

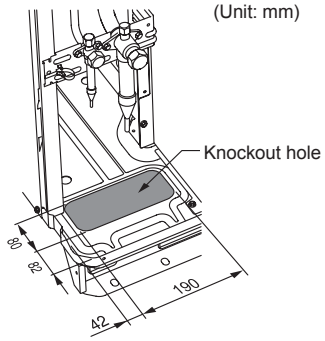
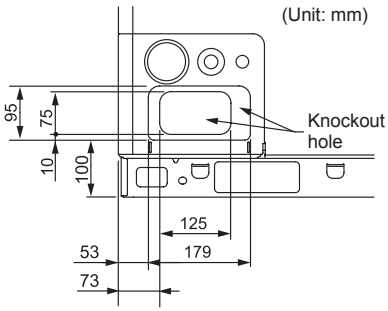


Fig. C Detail of knockout position (front)



5. 3. 2. Removing the pinch pipe

⚠ WARNING
Remove the pinch pipe only when the internal gas is completely drained. If gas still remains inside, the piping may crack if you melt the brazing filler metal of the junction area with a burner.

Before connecting the piping, remove the pinch pipe in accordance with the following instructions:

1) Verify that the liquid side and gas side 3-way valves are closed. (Fig. A)
2) Cut the end of the liquid side and gas side pinch pipe and vent the gas inside the pinch pipe. (Fig. B)
3) After all the gas is vented, melt the brazing filter metal on connecting part using a burner and remove the pinch pipe. (Fig. C)

Fig. A

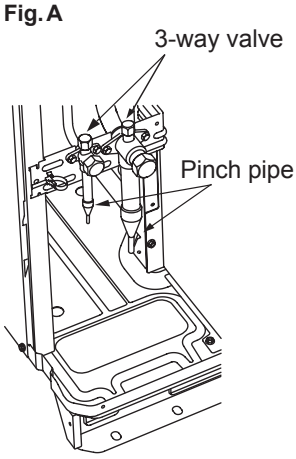


Fig. B

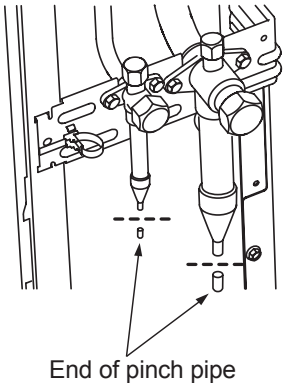
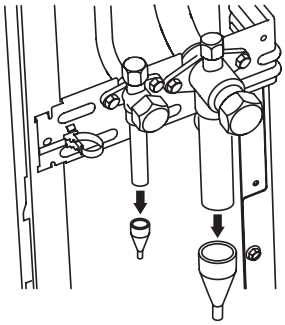


Fig. C



5. 3. 3. Pipe connection

⚠ CAUTION
• Seal the pipe route hole with putty (field supply) such that there are no gaps. Small insects or animals that are trapped in the outdoor unit may cause a short circuit in the electrical component box.
• To prevent pipe damage; do not make sharp bends in the pipe. Bend the pipe at a radius of 70mm or greater.
• Do not bent pipe many times at same part to prevent break.
• Do not use flare connection on the indoor unit pipe until the connection piping has been connected.
• Wait until the 3-way valve is completely cooled down before removing the pinch pipe or brazing the joint pipe. Otherwise, the 3-way valve may be damaged.

- Blaze the joint pipe onto the 3-way valves at the liquid and gas side.
  Process the joint pipe appropriately so that it can be connected easily with the main pipe.
- Blaze the joint pipe at the liquid and gas side with the main pipe.
  * Be sure to supply nitrogen when blazing.

Fig. A

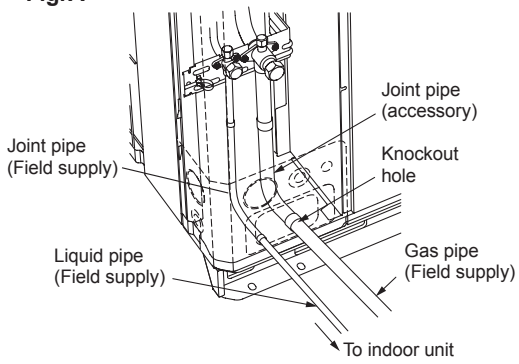
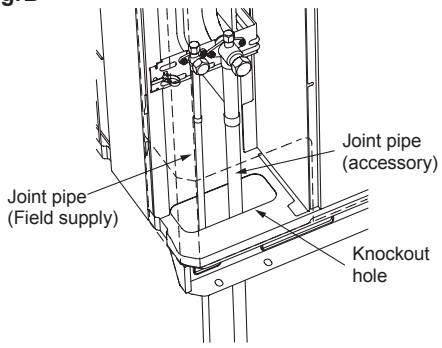


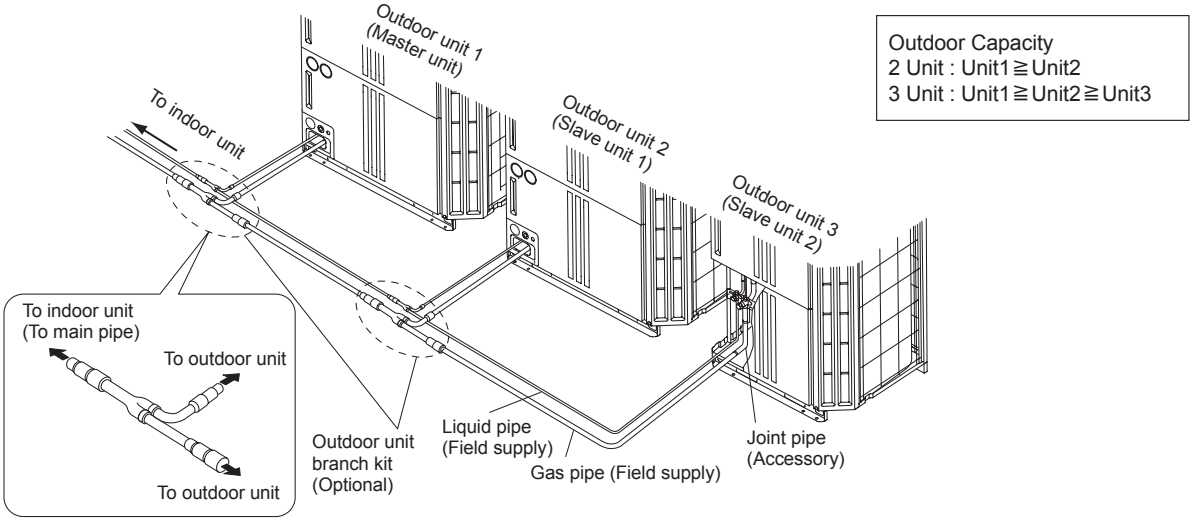
Fig. B



5. 4. Multiple connections

⚠ CAUTION

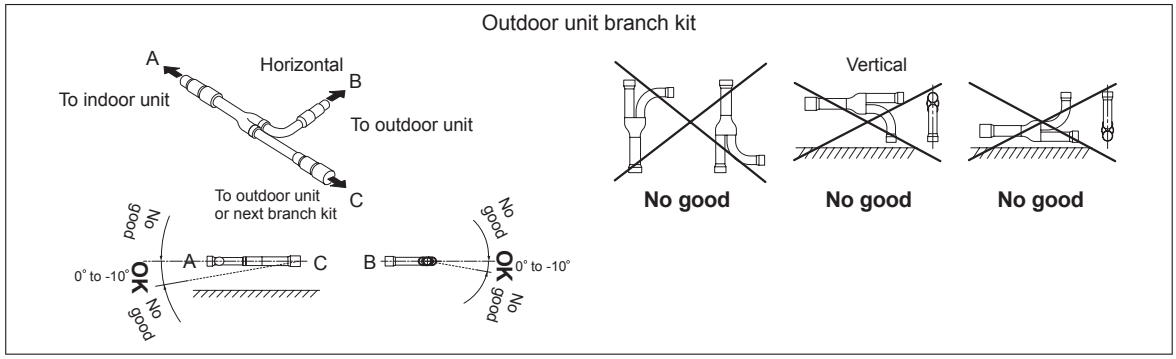
- When connecting multiple (maximum 3) units, be sure to install the unit with the largest capacity nearest to the indoor unit.
  For example) AJ□126LALH (Outdoor Unit1) + AJ□126LALH (Outdoor Unit2) + AJ□A90LALH (Outdoor Unit3)
- When connecting multiple units, set the unit with the largest capacity as the master unit, and the rest as the slave units. (Refer to 7. Field Setting)
- When connecting multiple units, use the optional outdoor unit branch kit.



Restriction when install

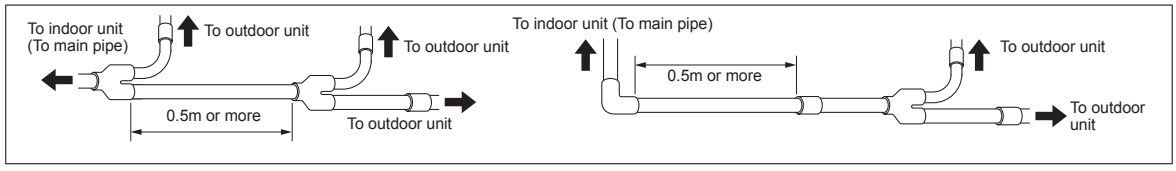
Be sure following restriction.

1) Installation angle



- Install the outdoor unit branch kit horizontally, within 0° to -10°, so that the refrigerant separates evenly.
- Do not install the outdoor unit branch kit vertically.

2) Straight pipe length

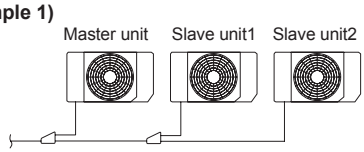


- Leave the distance 0.5m or more for straight part to outdoor unit branch kit.

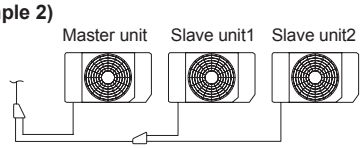
3) For details, refer to the Installation Instruction Sheet of the outdoor unit branch kit.

Fig. Examples of multiple unit installation

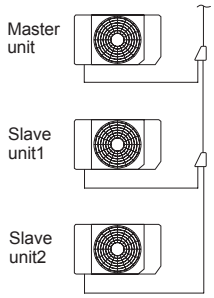
(Example 1)



(Example 2)



(Example 3)

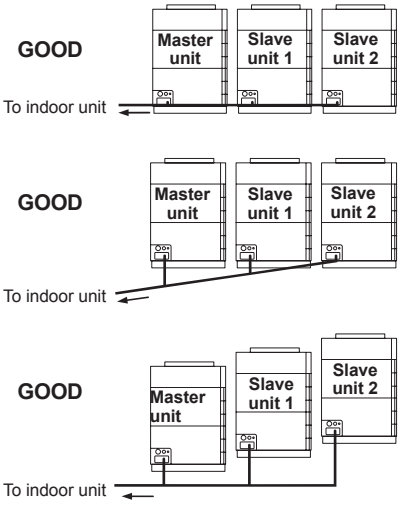


⚠ CAUTION

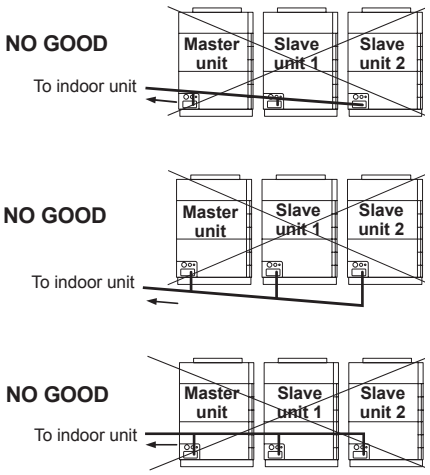
To prevent the oil from settling in the stopped unit, install the pipes between the outdoor units so that they are level or are tilted upward to the outdoor units.

(1) Examples of multiple unit installation are shown below.

a) Installable patterns

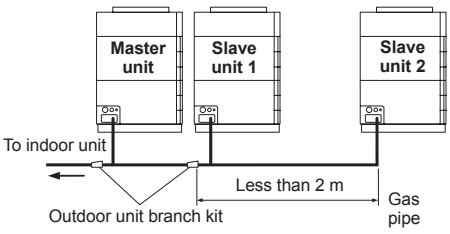


b) Non-installable patterns

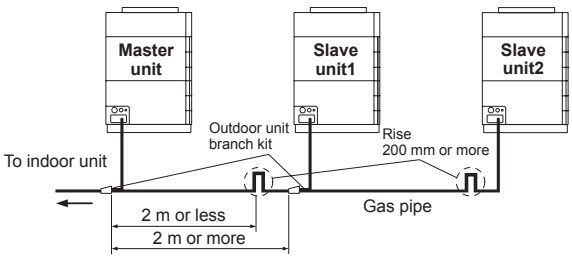


(2) When the length between branch kits and the length of the branch kit and outdoor units is more than 2m, provide a rise of 200mm or more on the gas pipe. However, there is no need to provide a rise on the pipe connecting to the master unit even if the length exceeds 2m.

a) In case of less than 2m



b) In case of 2m or more



6. ELECTRICAL WIRING

6. 1. The precautions of electrical wiring

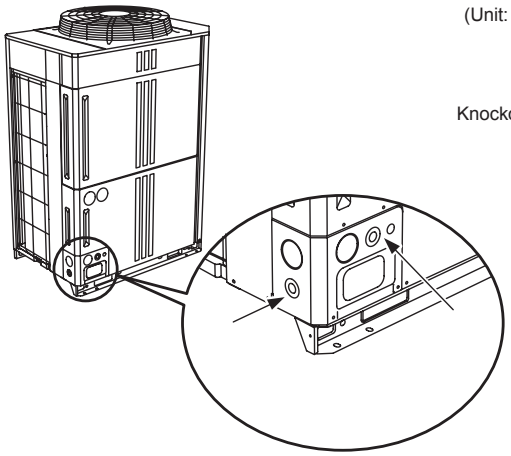
⚠ WARNING
• Wiring connections must be performed by a qualified person in accordance with specifications. The rated supply of this product is 50Hz, 400V of 3-phase, 4-wire. Use a voltage within the range of 342-456V.
• Before connecting the wires, make sure the power supply is OFF.
• Select a breaker (earth leakage breaker) of appropriate capacity and install one at every power supply of an outdoor unit. Wrong selection of breakers (earth leakage breakers) or transition wiring will lead to electric shock and fire.
• Do not connect AC power supply to the transmission line terminal board. Improper wiring can damage the entire system.
• Install a breaker (earth leakage breaker) in accordance with the related laws and regulations.
• Connect the connector cord securely to the terminal. Faulty installation can cause a fire.
• Do not modify power cable, use extension cable or branch wiring. Improper use may cause electric shock or fire by poor connection, insufficient insulation or over current.
• Make sure to secure the insulation portion of the connector cable with the cord clamp. A damaged insulation can cause a short circuit.
• Never install a power factor improvement condenser. Instead of improving the power factor, the condenser may overheat.
• Before servicing the unit, turn the power supply switch OFF. Then, do not touch electric parts for 10 minutes due to the risk of electric shock.
• Make sure to perform grounding work. Improper grounding work can cause electric shocks.

⚠ CAUTION
• The primary power supply capacity is for the air conditioner itself, and does not include the concurrent use of other devices.
• Connect the power cables in positive phase sequence. If they are connected in negative phase sequence, an error will be displayed. If there is a missing phase connection, the unit will not operate normally. Do not connect a N phase (neutral phase) cable to other phases (misconnection). Wrong wiring will lead to parts damage.
• Do not use crossover power supply wiring for the outdoor unit.
• If the electrical power is inadequate, contact your electric power company.
• Install a breaker (earth leakage breaker) in a location that is not exposed to high temperatures. If the temperature surrounding the breaker (earth leakage breaker) is too high, the amperage at which the breaker (earth leakage breaker) cuts out may decrease.
• Use a breaker (earth leakage breaker) that is capable of handling high frequencies. Because the outdoor unit is inverter controlled, a high-frequency earth leakage breaker is necessary to prevent a malfunction of the breaker itself.
• When the electrical switchboard is installed outdoors, place it under lock and key so that it is not easily accessible.
• Never bundle the power supply cable and transmission cable, remote control cable together. Separate these cable by 50 mm or more. Bundling these cables together will cause miss operation or breakdown.
• Always keep to the maximum length of the transmission cable. Exceeding the maximum length may lead to erroneous operation.
• The static electricity that is charged to the human body can damage the control PC Board when handling the control PC Board for address setting, etc. Please keep caution to the following points. Provide the grounding of Indoor unit, Outdoor unit and Option equipment. Cut off the power supply (breaker). Touch the metal section (such as the unpainted control box section) of the indoor or outdoor unit for more than 10 seconds. Discharge the static electricity in your body. Never touch the component terminal or pattern on the PC Board.

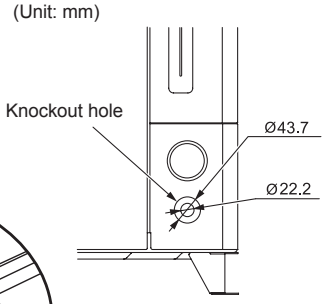
6. 2. Knockout hole

⚠ CAUTION
• Be careful not to deform or scratch the panel while opening the knockout holes.
• After opening the knockout hole, remove the burr on the edges to prevent snapping of wires. It is recommended to apply rust proof paint on the edges to prevent rust.

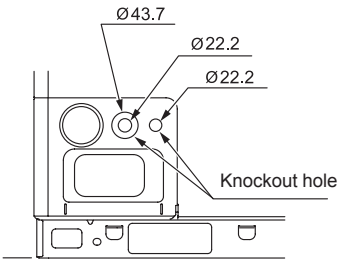
Electric wires can be connected from the front or from the left.
(Knockout holes are prepared so that wiring can be made from 2 different directions.)
Use the knockout holes on the front and the left separately when necessary.



(Unit: mm)



(Unit: mm)



6. 3. Selecting power supply cable and breaker

⚠ CAUTION
• Obtain the distribution network operator's agreement about the power capacity of the power supply system, specification of the cable and the harmonic current, and etc. when you connect the outdoor unit with the power supply.
• Regulation of wire size and circuit breaker differs from each locality, please refer in accordance with local rules.

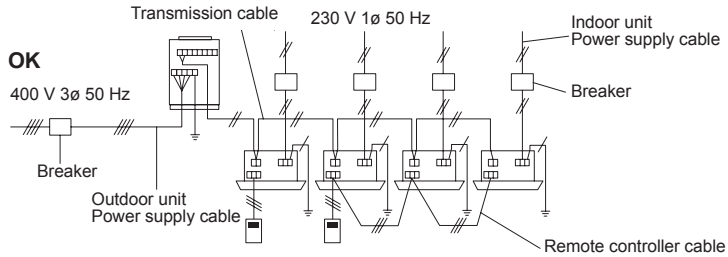
Refer to the table for the wiring and breaker specifications of each installation condition.

(1) Selecting power supply cable and breaker when connecting 1 outdoor unit

MODEL	Breaker (Time delay fuse or circuit capacity)		Outdoor unit power supply cable		
	Capacity (A)	Leakage current	Power supply cable (mm^2)	Ground wire (mm^2)	Critical wiring length (m)
AJ□A72LALH	30	100mA 0.1sec or less	4	4	30
AJ□A90LALH	30		4	4	30
AJ□108LALH	50		10	6	42
AJ□126LALH	50		10	6	42
AJ□144LALH	50		10	6	42

1) These values are recommended data.
2) Specification: Use conformed cord with Type 60245 IEC66
3) Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is long.

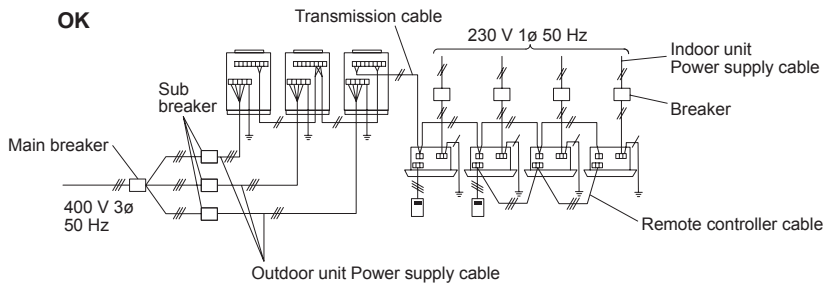
Fig. In case of connected outdoor unit (breaker: earth leakage breaker)



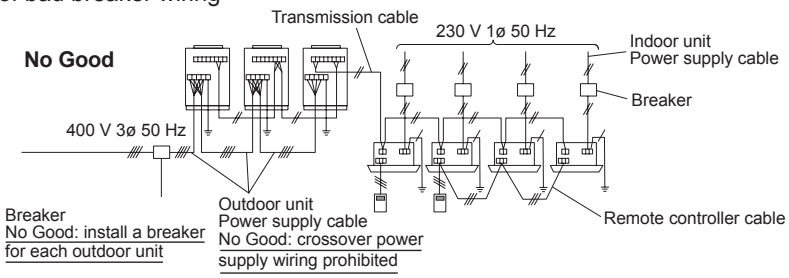
(2) Selecting main breaker and main power supply cable when connecting multiple outdoor units

Main breaker: Main breaker ≧ Total Sub breaker (Refer to the table in item (1) for the sub breaker capacity)

Fig. In case of connected 3 outdoor unit (breaker: earth leakage breaker)



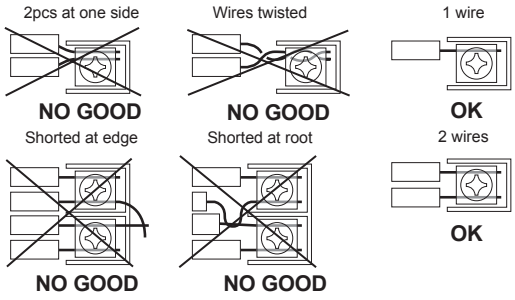
(3) Example of bad breaker wiring



6. 4. Transmission line

⚠ CAUTION

- Caution when wiring cable
  When stripping off the coating of lead wire, always use the exclusive tool such as a wire stripper. If there is no exclusive tool available necessarily, carefully strip the coating by a cutter etc. so that the conductive wire is not damaged.
  If it is damaged, it may lead to an open circuit and a communication error.
- Pay attention to the following points while attaching wires on the terminal board.
  Do not attach 2 wires on one side.
  Do not twist wires.
  Do not cross the wires.
  Do not shorted at edge at root.



6. 4. 1. Transmission wiring specifications

Follow the specifications below for the transmission cable.

Use	Size	Wire type	Remarks
Transmission cable	0.33mm^2	22AWG LEVEL 4 (NEMA) non-polar 2core, twisted pair solid core diameter 0.65mm	LONWORKS® compatible cable

6. 4. 2. Wiring rules

(1)Total length of transmission cable
Total transmission line length : MAX 3600m
EF+EG+GH+HJ+HK+KL < 3600m (Fig.2)
In the following cases , Signal Amplifier is required.
①When the total length of the transmission line exceeded 500m.
AB+BC+BD > 500m (Fig.1)
②When the total number of units* is over 64.
③Transmission line length between each unit*≧ 400m
(2)Length of transmission cable between 1 network segment (NS)
EF+EG+GH+HJ+HK ≦ 500m (Fig.2)
KL ≦ 400m (Fig.2)
(3)Length of transmission cable between outdoor units in a refrigerant system
MN ≦ 18m
NP ≦ 18m

NOTE) Unit* means indoor unit, outdoor unit, Touch Panel Controller and System Controller, Signal Amplifier, single split adaptor, Network Convertor etc..

Do not use loop wiring. This may lead to parts damage and erroneous operation.

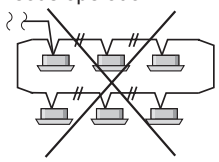


Fig. 1

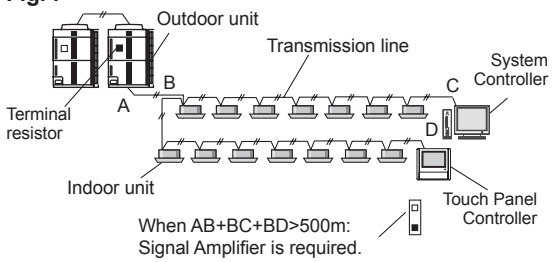
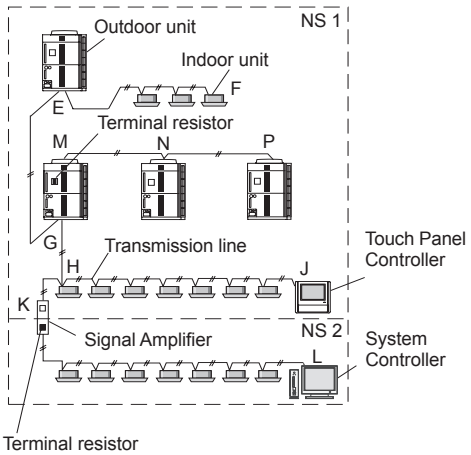


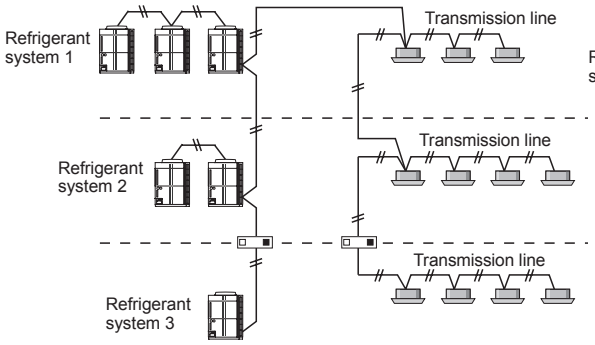
Fig. 2



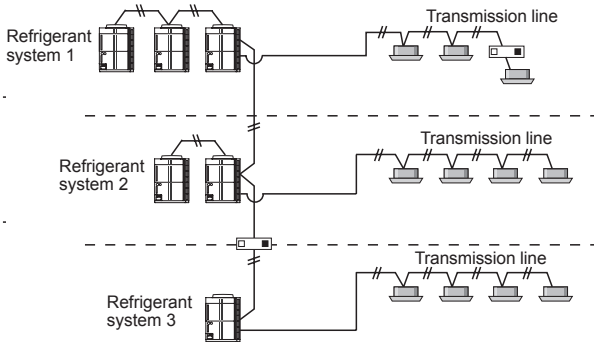
6. 4. 3. Enabling/Disabling automatic address setting

You can enable/disable automatic address setting for the indoor unit and the signal amplifier.
To enable automatic address setting for the indoor unit, connect the indoor unit to outdoor units under the same refrigerant system.(Fig.4)

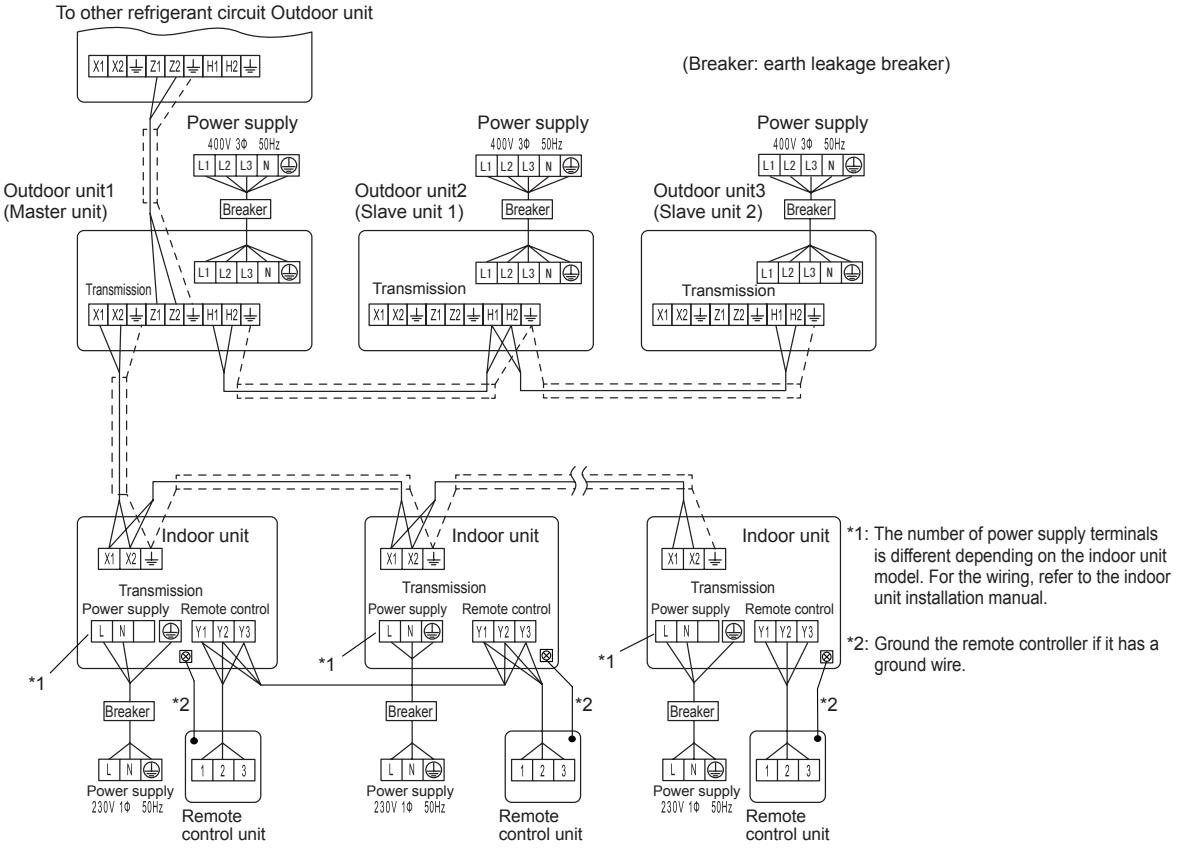
Example : Disable Automatic Address setting



Example : Enable Automatic Address setting



6. 5. Wiring method

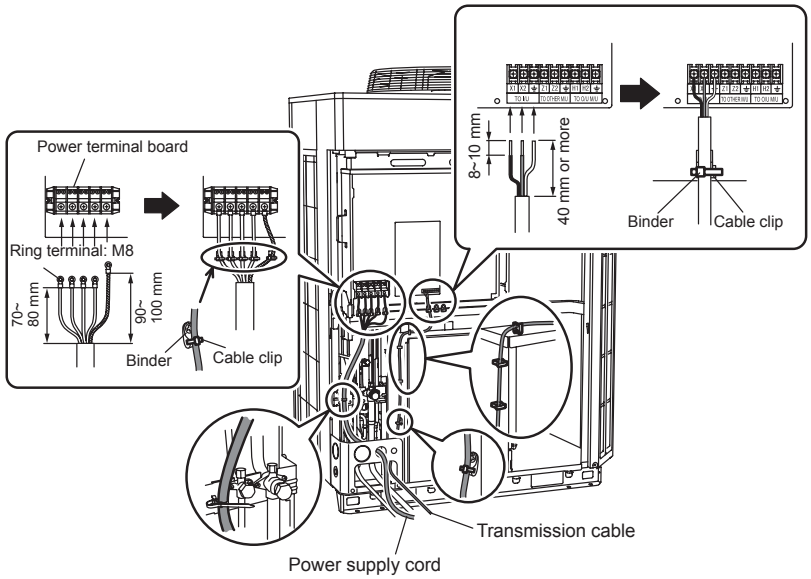


*1: The number of power supply terminals is different depending on the indoor unit model. For the wiring, refer to the indoor unit installation manual.

*2: Ground the remote controller if it has a ground wire.

The wiring example for outdoor and indoor units is shown in figure.
Remove the cover of the electrical component box and follow the terminal plate to connect the electric wires to the terminal.
After connecting the electric wires, secure them with a cable clamp.
Connect the wires without applying excessive tension.

Secure with a cable clamp as shown in the figure below.

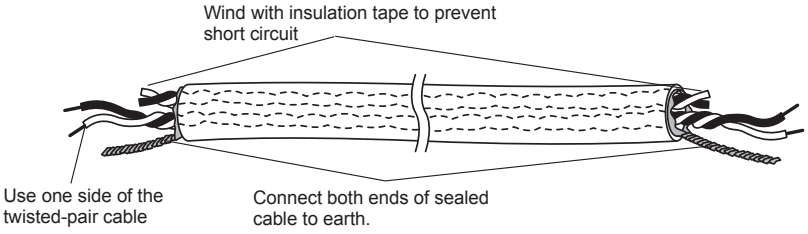


Tightening torque	
M3 screw	0.5 to 0.6 N·m (5 to 6 kgf·cm)
M8 screw	5.0 to 7.0 N·m (50 to 70 kgf·cm)

* Use a ring terminal to connect the electric wires to the power supply terminal board.

Sealing transmission cable

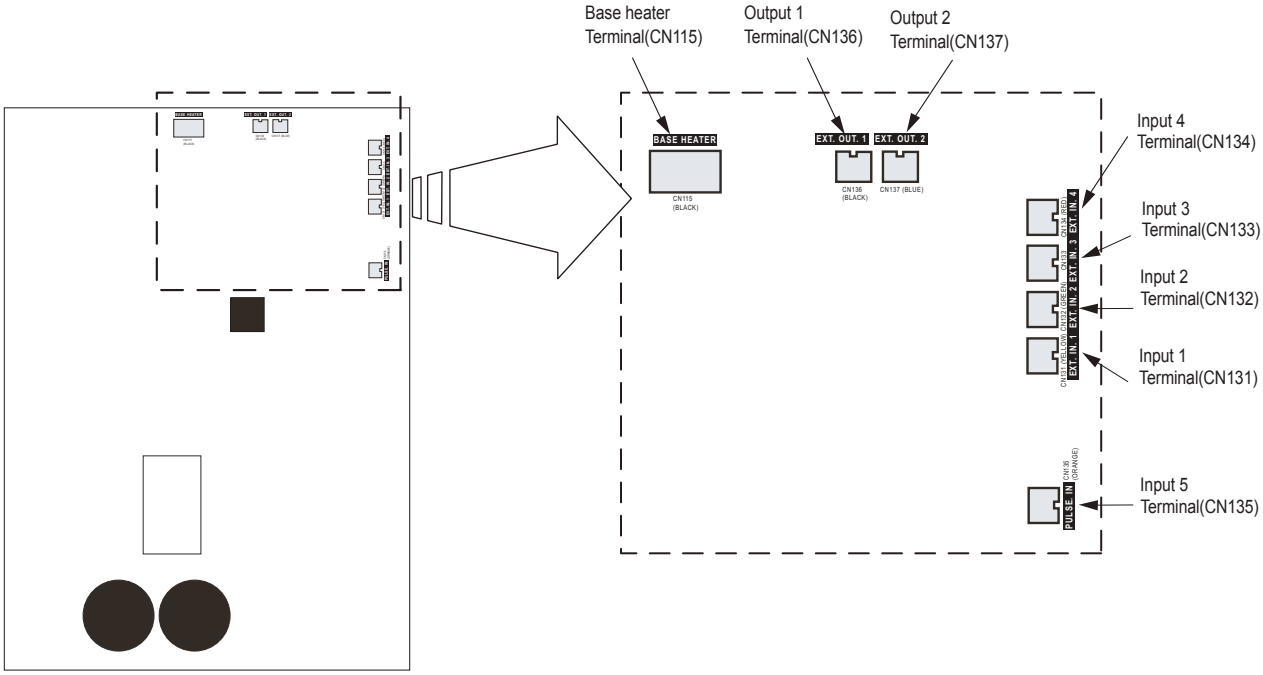
Connect both ends of the sealed wires of the transmission cable to the earth terminal of the equipment or to the earth screw near the terminal.
Be very careful that the screws are not overly tightened as the wires may snap and the terminal may be damaged.


Wind with insulation tape to prevent short circuit
Use one side of the twisted-pair cable
Connect both ends of sealed cable to earth.

Be sure to use one side of a twisted-pair cable when using transmission cable with 2 sets of twisted-pair cables.

6. 6. External input and external output

6. 6. 1. Terminal position



Outdoor unit printed circuit board

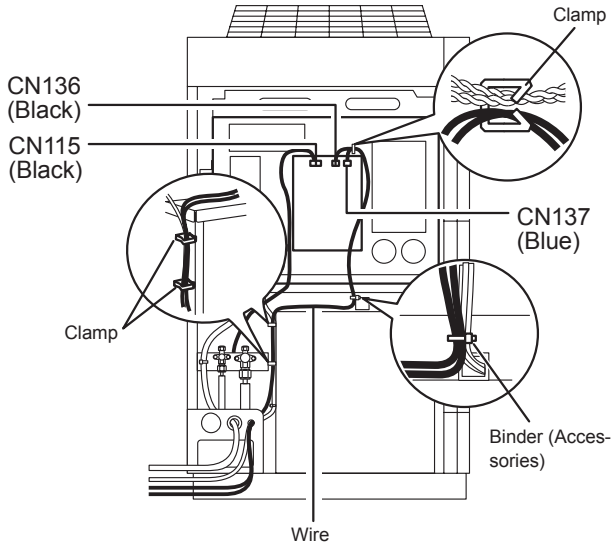
⚠ CAUTION
• Do not bind this wire with other wires.

(Example)

In case of Outdoor unit

(1) Insert the connector to CN136 (Black) and CN137 (Blue) of control PC board.

(2) Fix it to the wire with the attached binder.



▪ Do not clamp the base heater cable.

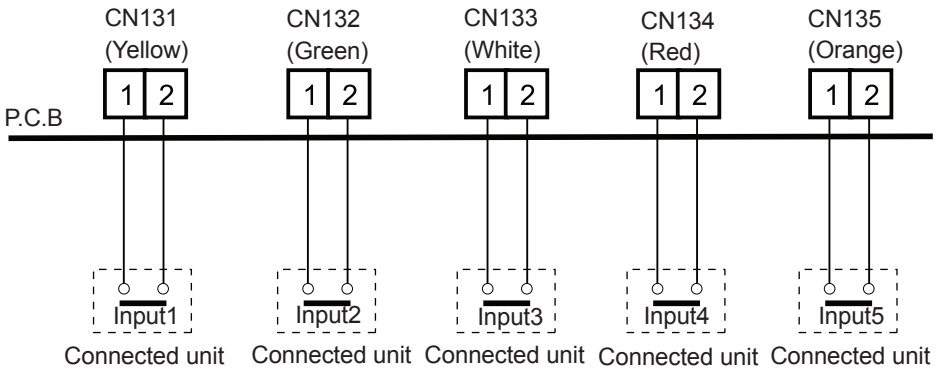
6. 6. 2. External input terminal

Service parts : EXTERNAL INPUT WIRE A (9368777005)

- Setting to low noise mode, cooling priority/heating priority selection, outdoor unit operation peak control setting, emergency/batch stop and electricity meter pulse are possible from the outside.
- Except for wattmeter pulse reception (CN135) among external input terminals, only the Master unit is effective.

Wiring method and specifications

* A twisted pair cable (0.33mm^2 (22AWG)) should be used. Maximum length of cable is 150m.
* Use an external input and output cable with appropriate external dimension, depending on the number of cables to be installed
* For each input, pin No.1 is of positive polarity and pin No.2 is of ground level.



Operation behavior

Each input terminal works as follows.

Connector	Input signal	Status	Outdoor unit	
			Master	Slave
CN131 (Yellow)	OFF	Normal operation	O	×
	ON	Low noise mode operation		
CN132 (Green) *1	OFF	Cooling priority	O	×
	ON	Heating priority		
CN133 (White)	OFF	Normal operation	O	×
	ON	Outdoor unit operation peak control		
CN134 (Red)	OFF	Normal operation	O	×
	ON	Batch stop or Emergency stop operation *2, *3		
CN135 (Orange) *4	No pulse	No information from electricity meter	O	O
	Pulse	Power usage information from electricity meter		

Slave unit can connect only input5 (CN135).

The operations of each input terminal and the selection of function are set with the push switch on the circuit board of outdoor unit. About the setting, please refer to 7.4. Push switch setting.

Note :

*1: The "external input priority mode" must be set by pressing push button on PC board of outdoor unit.

*2: Batch stop or Emergency stop pattern can be selected by outdoor unit PC board push button.

*3: The emergency stop function mounted in the V-II does not guarantee the regulations of each country. For this reason, sufficient checking is necessary regarding use.
Especially, since the fact that the equipment may not be emergency-stopped in the case of breaking of the wiring to the external input terminals and communication line, communication error due to noise, VRF external input circuit trouble, etc. must be considered, the provision of double measures that add direct interruption of the power supply by switch, etc. is recommended as a precaution.

*4: Pulse input to CN135 must be width 50ms or more, and must be interval 50ms or more.

6. 6. 3. External output terminal

Service parts : EXTERNAL INPUT WIRE A (9368777005)

- You can detect the operation condition of outdoor unit and the abnormal situation of both indoor and outdoor unit.
- The external output terminal is only valid for Master Unit.

Wiring method and specifications

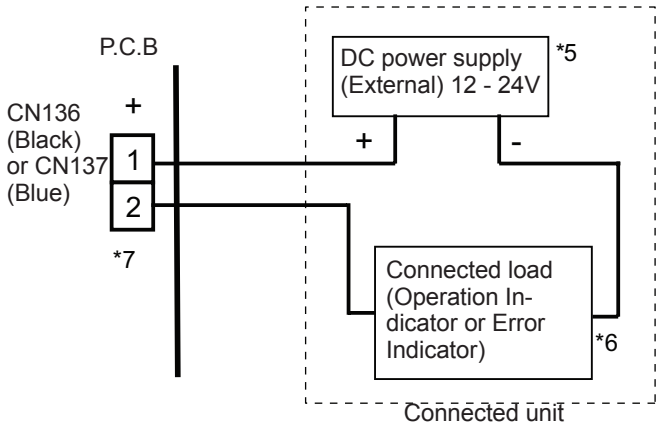
Error display (Master unit only)

This output indicates the outdoor unit and connected indoor unit's "Normal" or "Error" status.

Operation display (Master unit only)

This output indicates the outdoor unit's "Operation" status.

Connector	Output voltage	Status
CN136 (Black)	0V	Normal
	DC 12-24 V *5	Error
CN137 (Blue)	0V	Stop
	DC 12-24 V *5	Operation



*5: Provide a DC12 to 24V power supply.
Select a power supply capacity with an ample surplus for the connected load.

*6: The allowable current is 30mA or less.
Provide a load resistance such that the current becomes 30mA or less.

*7: Polarity is [+] for pin 1 and [-] for pin 2. Connect correctly.
Do not impress a voltage exceeding 24V across pins 1-2.

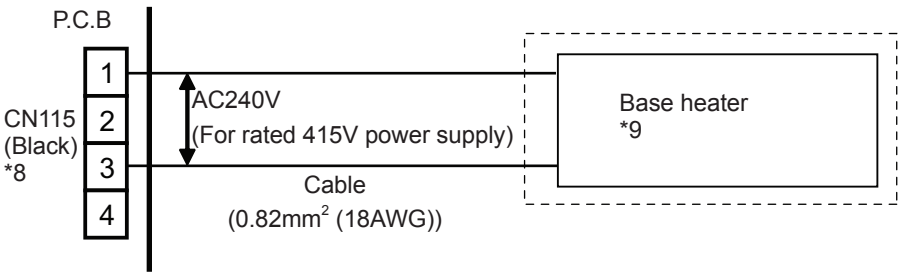
* A twisted pair cable (0.33mm^2 (AWG22)) should be used. Maximum length of cable is 150m.

* Use an external input and output cable with appropriate external dimension, depending on the number of cables to be installed.

6. 6. 4. Base heater terminal

Service parts : WIRE WITH CONNECTOR (9708642000)

This is the output signal for base heater. Output signal ON, when the outdoor temperature goes down below 2°C, and signal OFF at the outdoor temperature 4°C.



* 8: Connect to pin 1 and pin 3. No connection pin2 and pin4.

* 9: The allowable current is 1A or less.

7. FIELD SETTING

⚠ CAUTION

Discharge the static electricity from your body before setting up the DIP switches.
Never touch the terminals or the patterns on the parts that are mounted on the board.

7. 1. Field setting switches

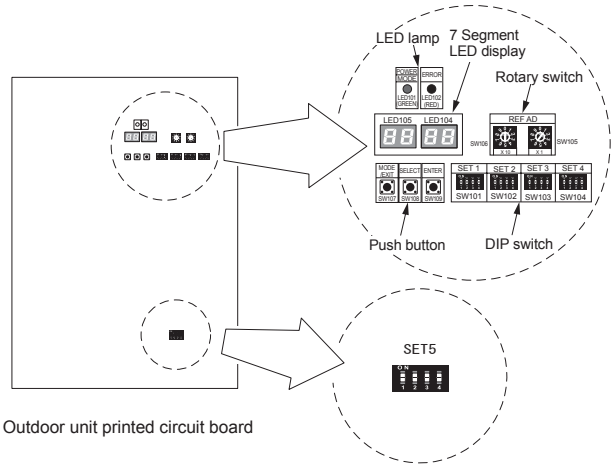
Remove the front panel of the outdoor unit and the cover of the electrical component box to access the print circuit board of the outdoor unit.
Print circuit board switches for various settings and LED displays are shown in the figure.

7. 2. DIP switch setting

7. 2. 1. List of Settings

SET3 and SET5 must be set for the DIP switch.
Configure the settings before turning on the power.
Settings for SET1, SET2, and SET4 DIP switches are factory default ones. Do not change them.

DIP Switch		Function
SET1	1-4	Forbidden
SET2	1-4	Forbidden
SET3	1	Outdoor unit address setting
	2	
	3	Setting for number of slave units
	4	
SET4	1-4	Forbidden
SET5	1-2	Number of outdoor units installed
	3	Forbidden
	4	Terminal resistor setting



Outdoor unit printed circuit board

7. 2. 2. Settings to be configured locally

(1) Outdoor unit address setting
When 2 or 3 outdoor units are installed to 1 refrigerant system, set the address for each outdoor unit.
Set the address for all outdoor units.

SET3		Outdoor unit address	Remarks
1	2		
OFF	OFF	0	Master unit only (Factory setting)
OFF	ON	1	Slave unit 1
ON	OFF	2	Slave unit 2
ON	ON	-	Forbidden

(2) Number of slave units setting for outdoor unit
Set the number of slave units connected to 1 refrigerant system.
Set only the master unit.

SET3		Number of connectable outdoor units	Remarks
3	4		
OFF	OFF	0	Master unit only (Factory setting)
OFF	ON	1	1 slave unit connected
ON	OFF	2	2 slave unit connected
ON	ON	-	Forbidden

(3) Number of outdoor units installed

The number of outdoor units installed in 1 refrigerant system must be set.
Set for all outdoor units.

SET5		Number of out-door units	Remarks
1	2		
OFF	OFF	1	(Factory setting)
OFF	ON	2	-
ON	OFF	3	-
ON	ON	-	Forbidden

7. 2. 3. Terminating resistor setting

⚠ Caution
Be sure to set the terminal resistor according to specifications. Set the terminal resistor for every network segment (NS).
If terminal resistor is set in multiple devices, the overall communication system may be damaged. If terminal resistor is not set in a device, abnormal communication may occur.

- Be sure to set 1 terminal resistor in a network segment. You can set the terminal resistor at the outdoor unit or signal amplifier.
- When setting the terminal resistor of a signal amplifier, refer to the installation manual of the signal amplifier.

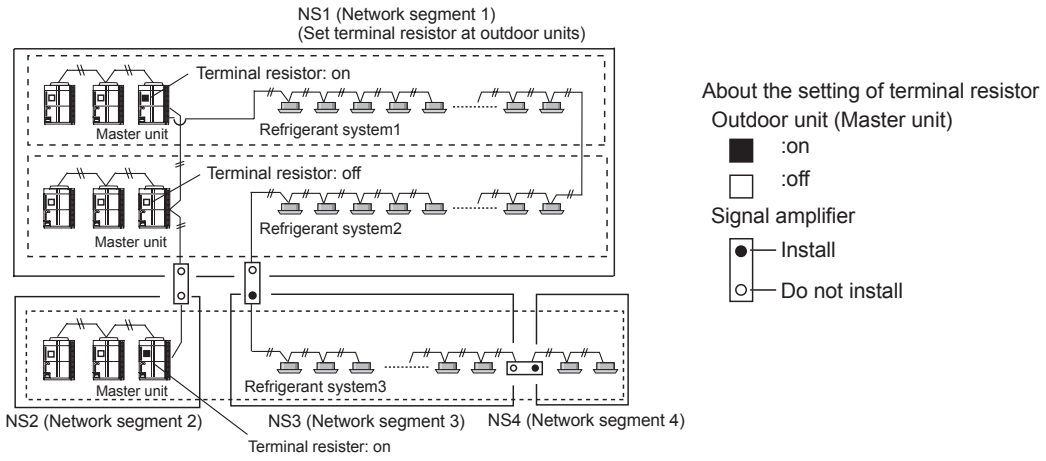
- When setting multiple terminal resistors, take note of the following items.

① How many network segments are there in a VRF system?
② Where will you set the terminal resistors in a network segment? (Condition for 1 segment: Total number of outdoor and indoor units and signal amplifiers is less than 64, or the total length of the transmission cable is less than 500m)
③ How many outdoor units are connected to 1 refrigerant system?

Configure the setting (DIP switch SET5) of the terminal resistor of the outdoor units as shown below from conditions ① to ③.

SET5	Terminal resistor	Remarks
4		
OFF	Disable	(Factory setting)
ON	Enable	-

Figure: Terminal resistor setting



7. 3. Rotary switch setting

The rotary switch (REF AD) sets the refrigerant circuit address of the outdoor unit. Configure the settings only on the master unit of a refrigerant system.
If multiple refrigerant systems are connected, set the rotary switch (REF AD) as shown in the table below.

Refrigerant circuit address	Rotary Switch Setting REF AD	
	×10	×1
0	0	0
1	0	1
2	0	2
3	0	3
4	0	4
5	0	5
•	•	•
•	•	•
•	•	•
97	9	7
98	9	8
99	9	9

Setting	Setting range	Type of switch		
Refrigerant circuit address	0–99	Setting example 63	REF AD × 10	REF AD × 1

Rotary Switch (REF AD×1): Factory setting "0"
Rotary Switch (REF AD×10): Factory setting "0"

7. 4. Push button setting

Various functions can be set. Set when necessary.
Perform settings after all indoor units have stopped operation.

Refer to Table A for the items that can be set.
Table. A: List of Settings

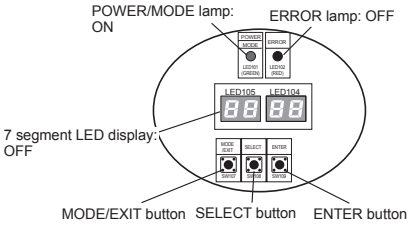
No	Setting Item		7 segment LED display First 2 digits		7 segment LED display Last 2 digits		Factory default	Content
0	Pipe length setting	Standard pipe (40 to 65m)	0	0	0	0	O	This item allows you to adjust the cooling cycle loss due to the length of the connected pipe. Set according to the length of the connected pipe. Set only the master unit for this item. * Pipe length means the length between master outdoor unit and the nearest indoor unit.
		Short pipe (less than 40m)			0	1		
		Long pipe 1 (65 to 90m)			0	2		
		Long pipe 2 (90 to 120m)			0	3		
		Long pipe 3 (120 to 150m)			0	4		
10	Compressor sequential start shift	No shift	1	0	0	0	O	This item allows you to delay the start timing of the outdoor units for every refrigerant system when multiple refrigerant systems have been configured. You can also limit the start current when multiple refrigerant systems are activated at the same time. Set only the master unit for this item.
		Shift 1 (21 seconds)			0	1		
		Shift 2 (42 seconds)			0	2		
		Shift 3 (63 seconds)			0	3		
11	Cooling capacity shift	Standard	1	1	0	0	O	Set this item when necessary.
		Save energy mode			0	1		
		High power mode 1			0	2		
		High power mode 2			0	3		
12	Heating capacity shift	Standard	1	2	0	0	O	Set this item when necessary.
		Save energy mode			0	1		
		High power mode 1			0	2		
		High power mode 2			0	3		
13	(Setting disabled)		1	3	0	0		(Factory default)
20	Emergency stop/ Forced stop toggle	Forced stop	2	0	0	0	O	This item allows you to stop the outdoor/indoor units of the same refrigerant system when a stop signal is received at the external input terminal “CN134”. • Forced stop: Operation can be resumed using a remote control. • Emergency stop: Once emergency stop is cancelled, you can start operation with a remote control. Set only the master unit for this item.
		Emergency stop			0	1		

21	Priority mode setting	First press priority	2	1	0	0	O	This item allows you to set the priority item in the cooling cycle operation mode. • First press priority: The operation mode that is configured first will be given priority. • Outdoor unit external input priority: The operation mode that is configured through the external input terminal "CN132" will be given priority. • Administrative indoor unit priority: The operation mode of the “administrative indoor unit” that is configured using a wired remote control will be given priority. Set only the master unit for this item.
		Outdoor unit external input priority			0	1		
		Administrative indoor unit priority			0	2		
22	Snowfall mode setting	Normal operation	2	2	0	0	O	This item allows you to operate the outdoor unit fan regularly in order to prevent the device from being disabled when the outdoor unit is buried in snow. Set only the master unit for this item.
		Snowfall mode			0	1		
23	Snowfall operation interval setting	Standard (30 mins)	2	3	0	0	O	This item allows you to configure the interval of the outdoor unit fan operation when “Snowfall mode” is selected. Set only the master unit for this item.
		Short 1 (5 mins)			0	1		
		Short 2 (10 mins)			0	2		
		Short 3 (20 mins)			0	3		
24	High static pressure mode setting	Standard	2	4	0	0	O	Set the high static pressure mode under the following conditions. High static pressure mode 1: When a duct is attached, the length of this duct is 150mm or less from the main unit and other resistive materials are not at the air flow outlet (30Pa or less). High static pressure mode 2: When a duct is attached, the length of this duct is 150mm or more from the main unit or there are other resistive materials at the air flow outlet (80Pa or less). Refer to “3.3.3. When there are obstacles above the product” for setting the high static pressure mode. Set both the master and slave units for this item.
		High static pressure mode 1			0	1		
		High static pressure mode 2			0	2		
25	(Setting disabled)		2	5	0	0	O	(Factory default)
26	(Setting disabled)		2	6	0	0	O	(Factory default)
27	(Setting disabled)		2	7	0	0	O	(Factory default)
28	(Setting disabled)		2	8	0	0	O	(Factory default)
29	(Setting disabled)		2	9	0	0	O	(Factory default)
30	Energy-saving level	Level 1 (stop operation)	3	0	0	0	O	This item allows you to limit the nominal system capacity or stop the operation when an “energy-saving peak cut” signal is received at the external input terminal “CN133”. Set only the master unit for this item.
		Level 2 (Limited at 40%)			0	1		
		Level 3 (Limited at 60%)			0	2		
		Level 4 (Limited at 80%)			0	3		
		Level 5 (Limited at 100%)			0	4		
40	Capacity priority setting during low noise operation	Low noise priority	4	0	0	0	O	”When “capacity priority” is selected, low noise operation mode will be canceled temporarily if the cooling/heating capacity is insufficient during low noise operation. (Once insufficient capacity is canceled, the unit will resume low noise operation mode) Set only the master unit for this item.
		Capacity priority			0	1		
41	Low noise operation setting	Normal operation	4	1	0	0	O	When “low noise operation ON” is selected, the operating noise will be suppressed. Set only the master unit for this item.
		Low noise operation	4	1	0	1		
42	Low noise operation level setting	Level 1 (55dB)	4	2	0	0	O	This item allows you to configure the noise level when the unit operates under low noise operation mode. Set only the master unit for this item.
		Level 2 (50dB)	4	2	0	1		
60	Backup operating settings	Enable	6	0	0	0	O	Set whether to run the outdoor backup operation.
		Disable			0	1		
70	Electricity meter No. settings 1		7	0	0	0	O	Set the digit positions for integers and tens for the electricity meter connected to CN135. ※ Points to note on common No. 70 and 71 If the electricity meter No. is set to “0” or “201-299”, the pulse entered into CN135 will be disabled.
					1	1		
					2	2		
					3	3		
					4	4		
					5	5		
					6	6		
					7	7		
					8	8		
					9	9		
71	Electricity meter No. settings 2		7	1	0	0	O	Set the digit position for the hundreds for the electricity meter connected to CN135.
					0	1		
					0	2		
72	Electricity meter pulse setting 1		7	2	0	0	O	Set the digit positions for the integers and tens of the pulse settings of the electricity meter connected to CN135. ※ Points to note on common No 72 and 73 If the electricity meter pulse is set to “0”, the pulse entered into CN135 will be disabled.
					1	1		
					2	2		
					3	3		
					4	4		
					5	5		
					6	6		
					7	7		
					8	8		
					9	9		

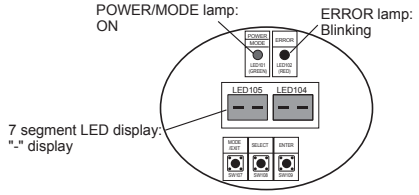
73	Electricity meter pulse setting 2		7	3	0	0	O	Set the digit positions for the hundreds and thousands of the pulse settings of the electricity meter connected to CN135.
					1	1		
					2	2		
					3	3		
					4	4		
					5	5		
					6	6		
					7	7		
					8	8		
					9	9		
90	(Setting disabled)		9	0	0	0	O	(Factory default)

(1) Turn on the power of the outdoor unit and enter standby mode.

- When system is normal
  POWER/MODE lamp lights up. (ERROR lamp is off.)



- When system is abnormal
  Check the settings as there is an error in the settings for outdoor unit address (DIP switch SET3-1, 2) or number of connected slave units (DIP switch SET3-3, 4).

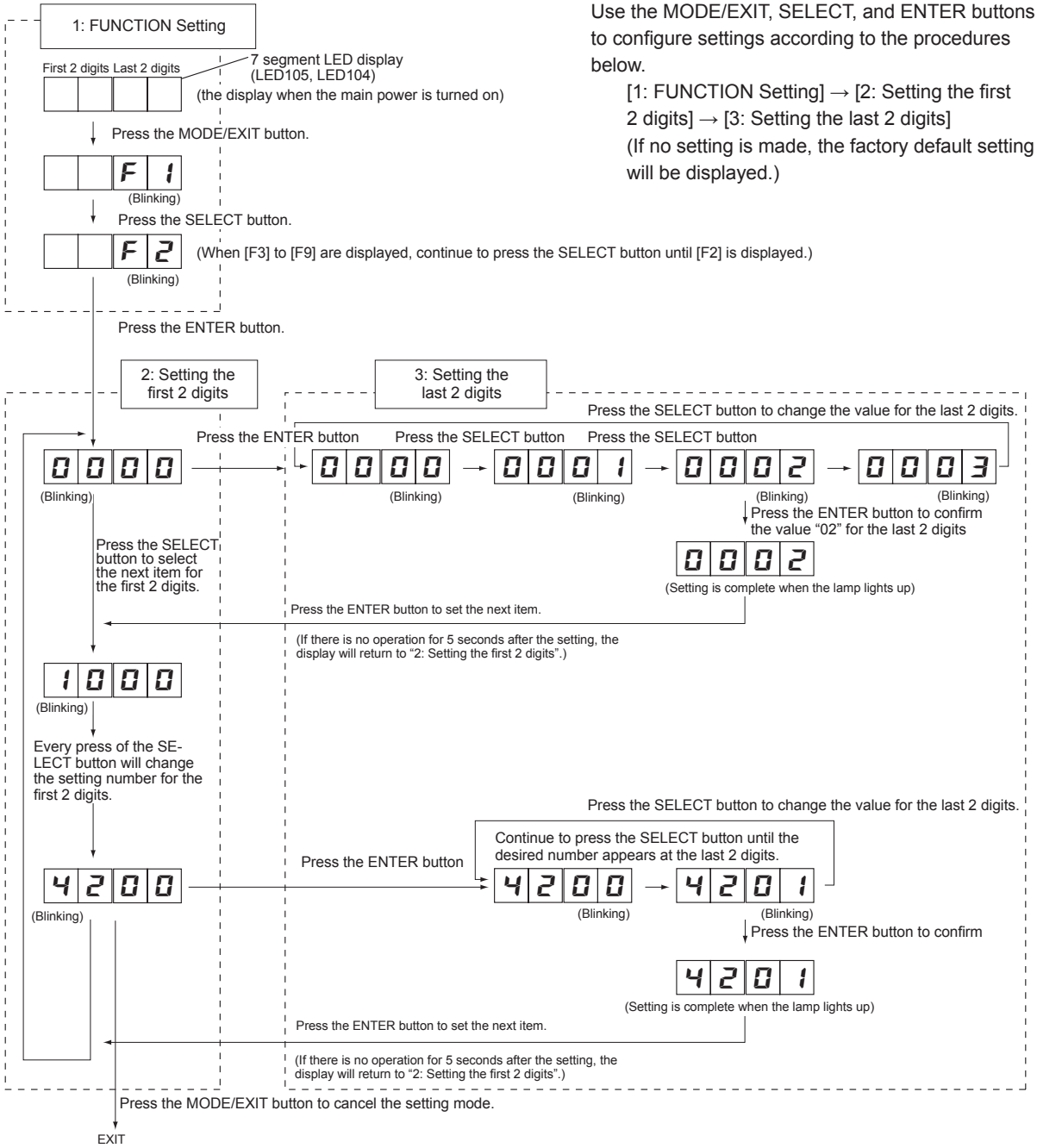


(2) Setting method

Use the MODE/EXIT, SELECT, and ENTER buttons to configure settings according to the procedures below.

[1: FUNCTION Setting] → [2: Setting the first 2 digits] → [3: Setting the last 2 digits]

(If no setting is made, the factory default setting will be displayed.)


1: FUNCTION Setting
First 2 digits Last 2 digits
7 segment LED display (LED105, LED104)
(the display when the main power is turned on)
Press the MODE/EXIT button.
F 1
(Blinking)
Press the SELECT button.
F 2
(When [F3] to [F9] are displayed, continue to press the SELECT button until [F2] is displayed.)
(Blinking)
Press the ENTER button.
2: Setting the first 2 digits
3: Setting the last 2 digits
Press the SELECT button to change the value for the last 2 digits.
Press the ENTER button
Press the SELECT button
Press the SELECT button
0 0 0 0
(Blinking)
0 0 0 0
(Blinking)
0 0 0 1
(Blinking)
0 0 0 2
(Blinking)
0 0 0 3
(Blinking)
Press the ENTER button to confirm the value “02” for the last 2 digits
0 0 0 2
(Setting is complete when the lamp lights up)
Press the SELECT button to select the next item for the first 2 digits.
Press the ENTER button to set the next item.
(If there is no operation for 5 seconds after the setting, the display will return to “2: Setting the first 2 digits”.)
1 0 0 0
(Blinking)
Every press of the SELECT button will change the setting number for the first 2 digits.
Press the SELECT button to change the value for the last 2 digits.
Continue to press the SELECT button until the desired number appears at the last 2 digits.
Press the ENTER button
4 2 0 0
(Blinking)
4 2 0 0
(Blinking)
4 2 0 1
(Blinking)
Press the ENTER button to confirm
4 2 0 1
(Setting is complete when the lamp lights up)
Press the ENTER button to set the next item.
(If there is no operation for 5 seconds after the setting, the display will return to “2: Setting the first 2 digits”.)
Press the MODE/EXIT button to cancel the setting mode.
EXIT

7. 5. Address setting for signal amplifiers

7. 5. 1. Address setting for signal amplifiers

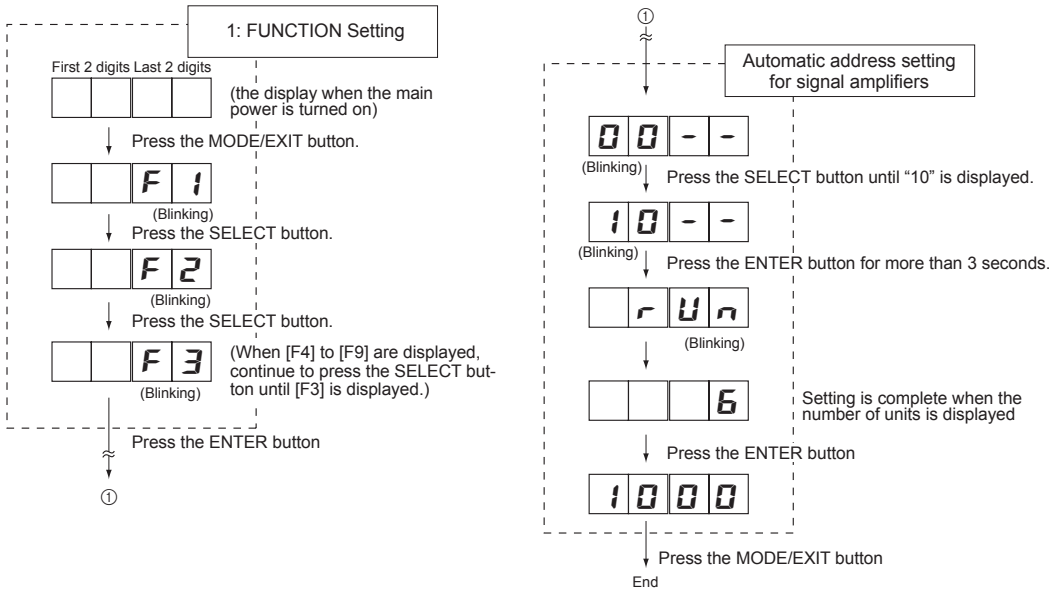
When using signal amplifiers, the address for signal amplifiers must be set.
The address for signal amplifiers can be set automatically from 1 outdoor unit (master unit) on the network.
Refer to the next section “Fig. Wiring example for automatic address setting” for the wiring example.
(For manual setting of address, refer to the signal amplifier installation manual.)

7. 5. 2. Automatic address setting for signal amplifiers

When setting the address of the signal amplifier, please use the factory setting. (See the installation manual of the signal amplifier)

When the system is normal, nothing will be displayed on the 7 segment LED display.
When ERROR is displayed, inspect the units.

Use the MODE/EXIT, SELECT, and ENTER buttons on the outdoor unit print circuit board to configure settings according to the procedures below.


1: FUNCTION Setting
First 2 digits Last 2 digits
(the display when the main power is turned on)
Press the MODE/EXIT button.
F 1
(Blinking)
Press the SELECT button.
F 2
(Blinking)
Press the SELECT button.
F 3
(When [F4] to [F9] are displayed, continue to press the SELECT button until [F3] is displayed.)
(Blinking)
Press the ENTER button
①
①
Automatic address setting for signal amplifiers
0 0 - -
(Blinking)
Press the SELECT button until “10” is displayed.
1 0 - -
(Blinking)
Press the ENTER button for more than 3 seconds.
(Blinking)
6
Setting is complete when the number of units is displayed
Press the ENTER button
1 0 0 0
Press the MODE/EXIT button
End

7. 6. Indoor unit address setting

7. 6. 1. Indoor unit address setting

Address must be set for the indoor unit.

Manual setting → •When setting with the switch inside the indoor unit, refer to the indoor unit operating manual.
•When setting with a remote control, refer to the remote control operating manual.

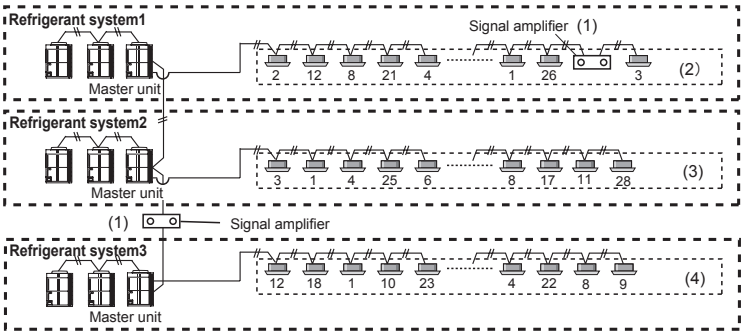
Automatic setting → •Check that the wiring is as shown in the figure below. Operate using the outdoor master unit of each refrigerant system.

Fig. Wiring example for automatic address setting

(1) Signal amplifier wiring example

(2)(3)(4) Indoor unit wiring example

(Connect the indoor and outdoor units of the same refrigerant system as shown below.)



NOTE) ・The automatic address function can be used for a maximum of 48 indoor units installed to the same refrigerant system. When network is connected to other refrigerant systems, the automatic address function cannot be used.

・The addresses of indoor units that have been configured automatically cannot be assigned in the order when they are installed. (Refer to the indoor unit installation manual for the procedures to check the addresses.)

7. 6. 2. Procedures to enable automatic address setting on indoor units

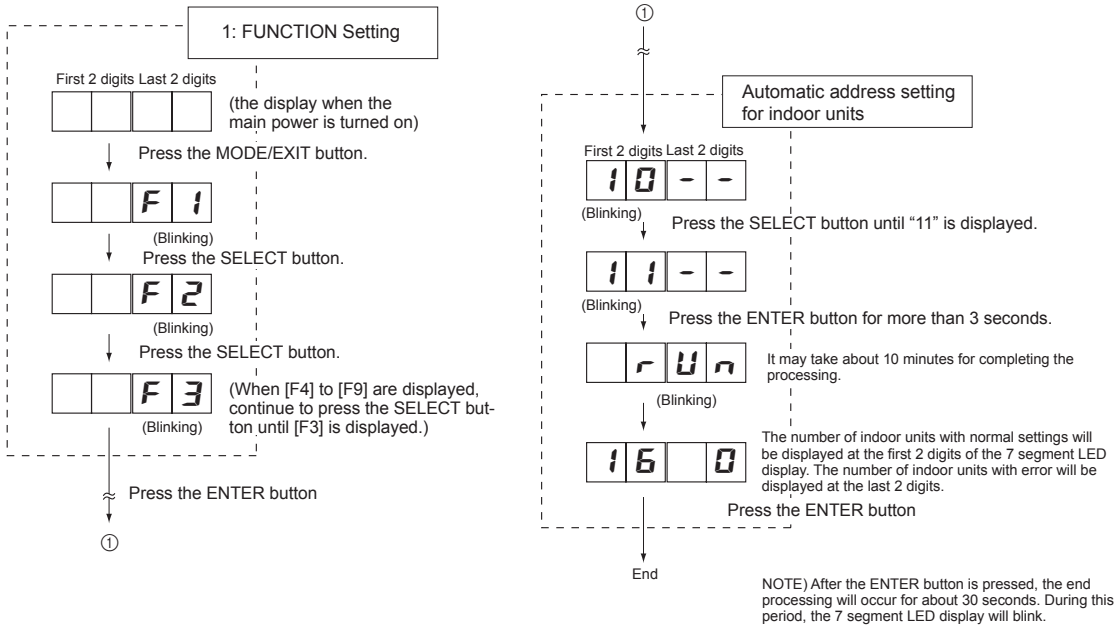
Check that the rotary switch IU AD on the indoor unit circuit board is set to “00”.If it is not set to “00”, it means the address of that device is not set. (factory default is “00”).

Turn on the power of the indoor and outdoor units.

When the system is normal, nothing will be displayed on the 7 segment LED display.

When ERROR is displayed, inspect the units.

Use the MODE/EXIT, SELECT, and ENTER buttons on the outdoor unit print circuit board to configure settings according to the procedures below.


1: FUNCTION Setting
First 2 digits Last 2 digits
(the display when the main power is turned on)
Press the MODE/EXIT button.
F 1
(Blinking)
Press the SELECT button.
F 2
(Blinking)
Press the SELECT button.
F 3
(When [F4] to [F9] are displayed, continue to press the SELECT button until [F3] is displayed.)
(Blinking)
Press the ENTER button
①
①
Automatic address setting for indoor units
First 2 digits Last 2 digits
1 0 - -
(Blinking)
Press the SELECT button until “11” is displayed.
1 1 - -
(Blinking)
Press the ENTER button for more than 3 seconds.
r U n
(Blinking)
It may take about 10 minutes for completing the processing.
1 6 0
The number of indoor units with normal settings will be displayed at the first 2 digits of the 7 segment LED display. The number of indoor units with error will be displayed at the last 2 digits.
Press the ENTER button
End
NOTE) After the ENTER button is pressed, the end processing will occur for about 30 seconds. During this period, the 7 segment LED display will blink.

7. 7. Resistance measurement of transmission cable (Measure with breaker OFF)

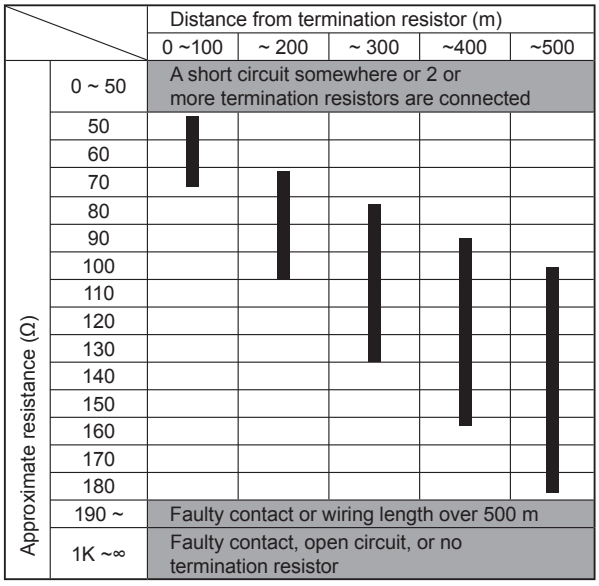
⚠ CAUTION

Do not turn on the power if the resistance between the terminals of the transmission cable is abnormal. Otherwise, the circuit board may be damaged.

Measure the resistance between 2 terminals of a transmission cable.

(1) Transmission cable connecting indoor units, outdoor units, and signal amplifiers
Measure the resistance of the signal amplifier terminal and the terminal of the indoor and outdoor units connected farthest away from the device where terminal resistor is measured.
A value from the table is displayed, depending on the distance from the signal amplifier and the device where the terminal resistor is set.
This value is an estimate.

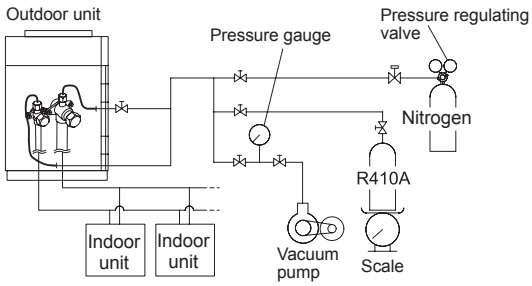
(2) Transmission cable connecting outdoor units in a refrigerant system
The resistance between the terminals of the transmission cable is 45-60Ω.
This value is an estimate.



8. PIPE INSTALLATION II

Fig. A Connection system

A) In case of connected 1 outdoor unit



B) In case of connected many outdoor units

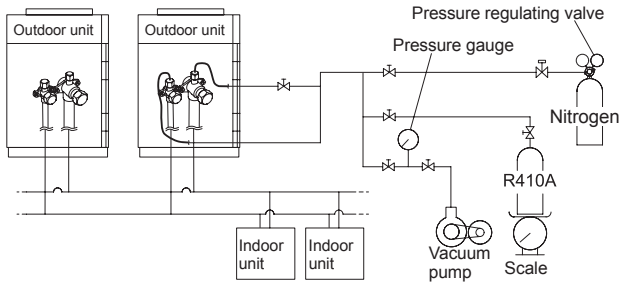


Fig. B

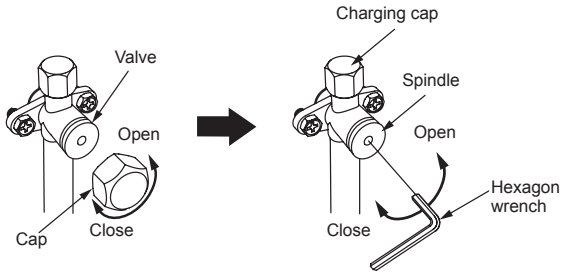


Table. A

Pipe	Spindle	Cap	Charging cap
Liquid valve	9.0 to 12.0 N·m (90 to 120 kgf·cm)	20.0 to 24.0 N·m (200 to 240 kgf·cm)	12.5 to 16.0 N·m (125 to 160 kgf·cm)
Gas valve	27.0 to 33.0 N·m (270 to 330 kgf·cm)	25.0 to 30.0 N·m (250 to 300 kgf·cm)	12.5 to 16.0 N·m (125 to 160 kgf·cm)

8. 1. Sealing test

⚠ CAUTION
• Use only nitrogen gas. Never use refrigerant gas, oxygen, in flammable gas or poisonous gas to pressurize the system. (If oxygen is used. There is the danger of an explosion.)
• Do not apply shock during sealing test. It can rupture the pipes and cause serious injury.
• Do not turn on the power unless all operations are complete.
• Do not block the walls and the ceiling until the sealing test and the charging of the refrigerant gas have been completed.

After connecting the pipes, perform an sealing test.
Recheck that the spindle of the 3-way valve are closed before performing a sealing test. (Fig. B)
Pour nitrogen gas through both the liquid pipe and the gas pipe.
Pressurize nitrogen gas to 4.2 MPa to perform the sealing test.

Check all flare connection areas and brazed areas.
Then, check that the pressure has not decreased.
Compare the pressures after pressurizing and letting it stand for 24 hours, and check that the pressure has not decreased.

* When the outdoor temperature changes 5 °C, the test pressure changes 0.05 MPa.
If the pressure has dropped, the pipe joints may be leaking.

If a leakage is found, immediately repair it and perform a sealing test again.

* Decrease the pressure of nitrogen gas before blazing

After completing the sealing test, release the nitrogen gas from both valves.
Release the nitrogen gas slowly.

8. 2. Vacuum process

⚠ CAUTION
• Do not turn on the power unless all operations are complete.
• If the system is not evacuated sufficiently, its performance will drop.
• If moisture might enter the piping, follow below. (i.e., if doing work during the rainy season, if the actual work takes long enough that condensation may form on the inside of the pipes, if rain might enter the pipes during work, etc.) • After operating the vacuum pump for 2 hours, pressurize to 0.05 MPa (i.e., vacuum breakdown) with nitrogen gas, then depressurize down to -100.7kPa (-755mmHg) for an hour using the vacuum pump (vacuum process). • If the pressure does not reach -100.7kPa (-755mmHg) even after depressurizing for at least 2 hours, repeat the vacuum breakdown - vacuum process. After vacuum process, maintain the vacuum for an hour and make sure the pressure does not rise by monitoring with a vacuum pauge.

Evacuation procedure

1) Remove the caps of the gas pipe and liquid pipe and check that the valves are closed.
2) Remove the charging cap.
3) Connect a vacuum pump and a pressure gauge to a charging hose and connect it to the charging port.
4) Activate the vacuum pump and vacuum the indoor unit and connection piping until the pressure gauge becomes -100.7kPa (-755mmHg).
   Evacuate from both the gas pipe and the liquid pipe.
5) Continue evacuating the system for 1 hour after the pressure gauge reads -100.7kPa (-755mmHg).
6) Remove the charging hose and reinstall the charging cap.

8. 3. Additional charging

⚠ CAUTION
• Do not turn on the power unless all operations are complete.
• After evacuating the system, add refrigerant.
• Do not charge the system with a refrigerant other than R410A.
• Always keep to the limit on the total amount of refrigerant. Exceeding the limit on the total amount of refrigerant will lead to malfunction during charging of refrigerant.
• Do not reuse recovered refrigerant.
• Use an electronic scale to measure the charging amount of refrigerant. Adding more refrigerant than the specified amount will cause a malfunction.
• Charge refrigerant using the liquid pipe. Adding refrigerant through the gas pipe will cause a malfunction.
• Add refrigerant by charging the system with the refrigerant in the liquid state. If the refrigerant cylinder is equipped with a siphon, it is not necessary to place the cylinder upright.

8. 3. 1. Procedure for charging the system with refrigerant

1) Remove the charging cap from the liquid pipe.
2) Attach a charging hose to the refrigerant cylinder, and connect it to the charging port.
3) Add refrigerant by calculating the additional refrigerant volume in accordance with the calculation formula indicated below.
4) Remove the charging hose and install the charging cap.
5) Remove the body caps (gas pipe, liquid pipe, and oil pipe {if multiple units are installed}), and open the valves.
6) Close the body caps.
7) After adding refrigerant, indicate the added charging volume on the unit.

* Tighten the body caps and charging caps to the torque values specified in the Table A.
To open and close the valves,
Use an M4 hexagon wrench for liquid and oil pipes.
Use an M10 hexagon wrench for gas pipes.

* * If you can not charge the specified amount of refrigerant with the above method, be sure to charge the refrigerant through the gas pipe while operating in cooling mode. In order to prevent liquid back-flow, carefully operate the cooling cylinder valve so that the refrigerant will flow in certain part at a time.

8. 3. 2. Checking total amount of refrigerant and calculating the amount of refrigerant charge to be added

- The amount of refrigerant charge to be added is the total value of the basic refrigerant charge amount and the value calculated from the length of the liquid pipe.
- Round up the value to 2 decimal places.

Model	HP	d Factory charged amount (kg)	a Additional amount for outdoor unit (kg)
AJ□A72LALH	8HP	11.20	0
AJ□A90LALH	10HP	11.20	0
AJ□108LALH	12HP	11.80	1.20
AJ□126LALH	14HP	11.80	3.30
AJ□144LALH	16HP	11.80	3.30

Diameter of liquid pipe (mm)	b Additional amount for pipe length (kg/m)
Ø6.35	0.021
Ø9.53	0.058
Ø12.70	0.114
Ø15.88	0.178
Ø19.05	0.268

(1) Calculation of additional amount for outdoor unit

A = [**a** Outdoor unit1 additional amount for outdoor unit ___ kg] + [**a** Outdoor unit2 additional amount for outdoor unit ___ kg] + [**a** Outdoor unit3 additional amount for outdoor unit ___ kg] = [**Total** ___ kg]

(2) Calculation of additional amount for pipe length

B = [Total length of ø19.05 mm liquid pipe ___ m × **b** × 0.268 (kg/m) ___ kg] + [Total length of ø15.88 mm liquid pipe ___ m × **b** × 0.178 (kg/m) ___ kg] + [Total length of ø12.70 mm liquid pipe ___ m × **b** × 0.114 (kg/m) ___ kg] +

[Total length of ø9.53 mm liquid pipe ___ m × **b** × 0.058 (kg/m) ___ kg] + [Total length of ø6.35 mm liquid pipe ___ m × **b** × 0.021 (kg/m) ___ kg] = [**Total** ___ kg]

(3) Calculation of additional charge refrigerant

C=A+B = ___ kg (Round up C to 2 decimal place)

(4) Calculation of factory charged amount

D = [**d** Outdoor unit1 factory charged amount ___ kg] + [**d** Outdoor unit2 factory charged amount ___ kg] + [**d** Outdoor unit3 factory charged amount ___ kg] = [**Total** ___ kg]

(5) Total refrigerant amount check

E=C+D= ___ kg

Note : Check the total refrigerant amount under the following conditions

Condition	Computational formula
For 1 outdoor unit per refrigerant system : Total amount of refrigerant ≦ 31.5kg	E ≦ 31.5kg
For 2 outdoor units per refrigerant system : Total amount of refrigerant ≦ 63kg	E ≦ 63kg
For 3 outdoor units per refrigerant system : Total amount of refrigerant ≦ 94.5kg	E ≦ 94.5kg

<Calculation>

- When there are 3 outdoor units (AJ□144LALH, AJ□126LALH, AJ□108LALH) connected to 1 system

(1) Calculation of additional amount for outdoor unit
A=3.30(kg)+3.30(kg)+1.20(kg)=7.80(kg)
(2) Calculation of additional amount for pipe length
If liquid pipe piping length is the following
φ19.05 : 50m, φ15.88 : 25m, φ12.70 : 0m, φ9.53 : 20m, φ6.53 : 15m
Additional charge volume B=50(m)×0.268(kg/m)+25(m)×0.178(kg/m)+0(m)×0.114(kg/m)
+20(m)×0.058(kg/m)+15(m)×0.021(kg/m)
=19.325kg
(3) Calculation of additional charge refrigerant
C=A+B =7.80(kg)+19.33(kg)=27.13(kg)
(4) Calculation of factory charged amount
D=11.8(kg)+11.8(kg)+11.8(kg)=35.4 (kg)
(5) Check the total amount of refrigerant
When 3 outdoor units are connected to 1 system, the following condition must be satisfied.
Condition: E=C+D≦94.5(kg)
Calculation: 27.13(kg)+35.4(kg)=62.53(kg)<94.5(kg)
→No problem if the above condition is satisfied.

8. 4. Installing insulation

- Install insulation material after conducting the “8.1 Sealing Test”.
- To prevent condensation and water droplets, install insulation material on the refrigerant pipe.
- Refer to the table to determine the thickness of the insulation material.
- If the outdoor unit is installed at a level that is higher than the indoor unit, the water that has condensed in the 3-way valve of the outdoor unit could travel to the indoor unit.
  Therefore, use putty in the space between the pipe and the insulation to prevent the entry of water.

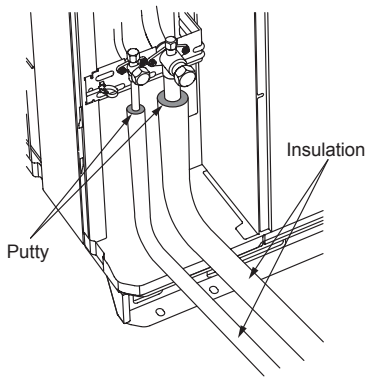


Table. Selection of insulation
(for using an insulation material with equal heat transmission rate or below 0.040W/(m·k))

		Insulation material			
		Minimum thickness (mm)			
Relative humidity		≦ 70%	≦ 75%	≦ 80%	≦ 85%
Pipe diameter (mm)	6.35	8	10	13	17
	9.52	9	11	14	18
	12.70	10	12	15	19
	15.88	10	12	16	20
	19.05	10	13	16	21
	22.22	11	13	17	22
	28.58	11	14	18	23
	34.92	11	14	18	24
	41.27	12	15	19	25

* When an ambient temperature and relative humidity exceed 32 °C, please strengthen heat insulation of refrigerant pipe.

9. TEST RUN

9. 1. Pre-test run check items

Before the test operation, check the following items.

① Is there a gas leakage? (At pipe connections {flange connections and brazed areas})
② Is the system charged with the specified volume of refrigerant?
③ Is the refrigerant circuit address correct?
④ Is a breaker installed at the power supply cable of every outdoor unit?
⑤ Are the wires connected to the terminals without looseness, and in accordance with the specifications?
⑥ Are the initial settings of the switches of the outdoor unit correctly configured?
⑦ Is the 3-way valve of the outdoor unit open? (Gas pipe and liquid pipe)
⑧ Is power supplied to the crank case heater for more than 12 hours? Electricity current in short period of time may result in compressor damage.
⑨ Are all the indoor units within the same coolant system connected to the power? Operating indoor units which are not connected to the power may result in malfunctions.

After checking that the above items are all in order, refer to “9.2 Test operation method” to test operation the unit.

If there are problems, adjust immediately and recheck.

9. 2. Test operation method

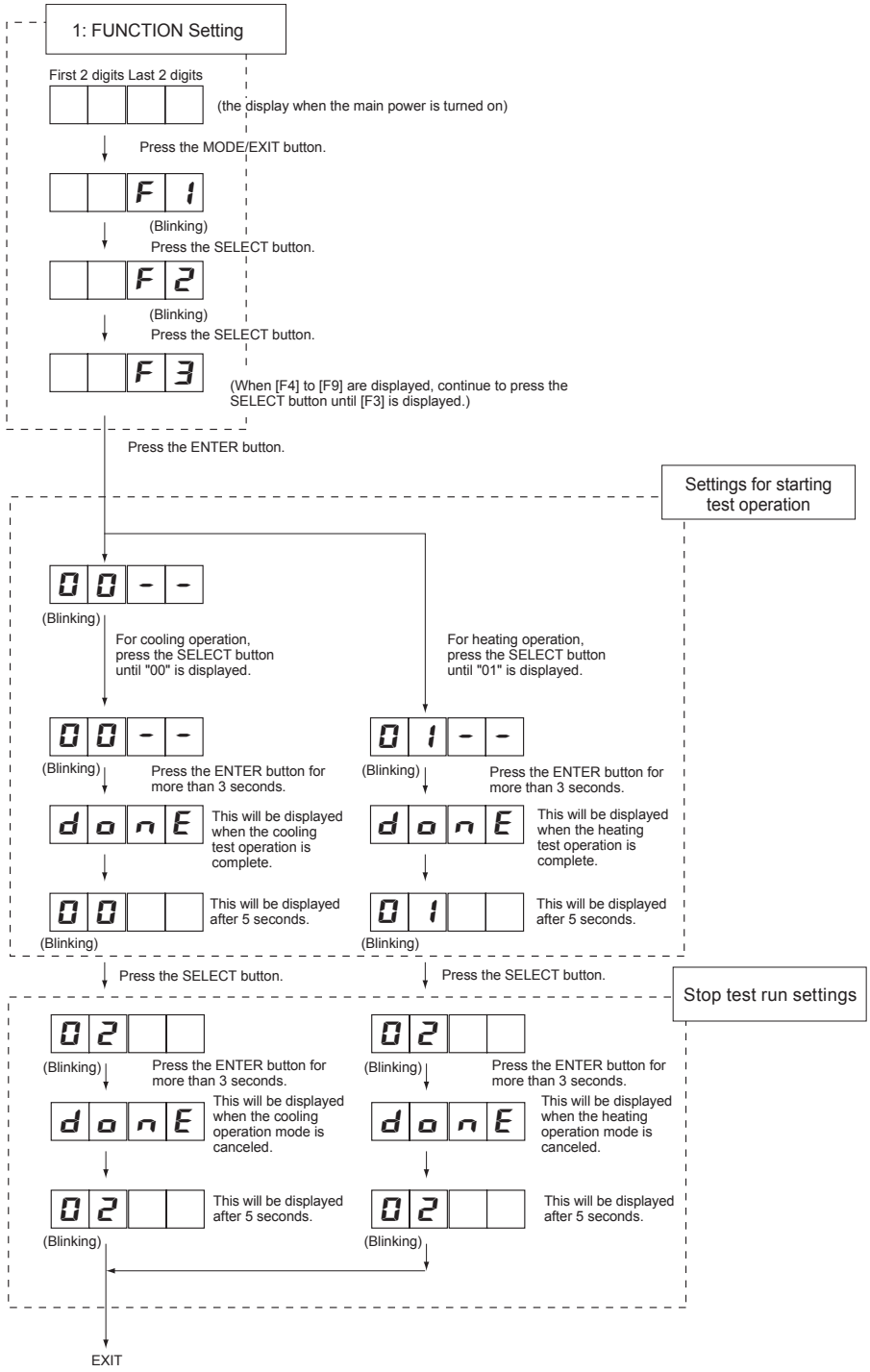
Be sure to configure test run settings only when the outdoor unit has stopped operating.

- Depending on the communication status between the indoor and outdoor units, it may take several minutes for the system to start operating after settings for the test run are complete.
- After the test run settings are complete, all the outdoor units and the connected indoor units will start operating. Room temperature control will not activate during test operation (continuous operation).
- If a knocking sound can be heard in the liquid compression of the compressor, stop the unit immediately and then energize the crank case heater for a sufficient length of time before restarting the operation.

Perform test operation for each refrigerant system.
You can set "cooling test operation" or "heating test operation" with the push-button switch on the outdoor unit print circuit board.

Test operation setting method

Use the MODE/EXIT, SELECT, and ENTER buttons on the indoor unit print circuit board to configure settings according to the procedures below.


1: FUNCTION Setting
First 2 digits Last 2 digits
(the display when the main power is turned on)
Press the MODE/EXIT button.
F 1
(Blinking)
Press the SELECT button.
F 2
(Blinking)
Press the SELECT button.
F 3
(When [F4] to [F9] are displayed, continue to press the SELECT button until [F3] is displayed.)
Press the ENTER button.
Settings for starting test operation
0 0 - -
(Blinking)
For cooling operation, press the SELECT button until "00" is displayed.
For heating operation, press the SELECT button until "01" is displayed.
0 0 - -
(Blinking)
Press the ENTER button for more than 3 seconds.
d o n E
This will be displayed when the cooling test operation is complete.
0 0
This will be displayed after 5 seconds.
(Blinking)
0 1 - -
(Blinking)
Press the ENTER button for more than 3 seconds.
d o n E
This will be displayed when the heating test operation is complete.
0 1
This will be displayed after 5 seconds.
(Blinking)
Press the SELECT button.
Press the SELECT button.
Stop test run settings
0 2
(Blinking)
Press the ENTER button for more than 3 seconds.
d o n E
This will be displayed when the cooling operation mode is canceled.
0 2
This will be displayed after 5 seconds.
(Blinking)
0 2
(Blinking)
Press the ENTER button for more than 3 seconds.
d o n E
This will be displayed when the heating operation mode is canceled.
0 2
This will be displayed after 5 seconds.
(Blinking)
EXIT

After the test operation is complete, turn off the power. Attach the cover of the electrical component box and the front panel of the outdoor unit.

Note

- Check that the indoor and outdoor units connected to the same refrigerant system are operating normally.
- When indoor or outdoor units are not operating, or when the indoor and outdoor units of other refrigerant systems are operating, the indoor/outdoor unit address or DIP switch for the number of connected slave units are not configured correctly.
- The system will not operate normally with an incorrect DIP switch setting.
  Stop the system immediately and recheck the DIP switch setting.

9. 3. Checklist

	Check description	Check method	Criteria
1	High and low pressure values are normal.	Check it with a pressure gauge.	Cooling: low pressure approx. 0.8 MPa Heating: high pressure approx. 3.0 MPa
2	Drain water is discharged smoothly through the drain hose.	Check it by pouring water.	—
3	Indoor and outdoor unit fans are operating.	Check them visually.	—
4	Compressor operates after the indoor unit operates.	Check the operating sound.	—
5	Difference between inlet and outlet temperatures is normal.	Measure the inlet and outlet temperatures.	Temperature difference 10 degrees
6	Error is not displayed	Check the 7 segment LED display	Error blinking or no error code display

10. LED Display

You can determine the operating status by the lighting up and blinking of the 7 segment LED display.
Check the status using the table below.

10. 1. Normal operation mode

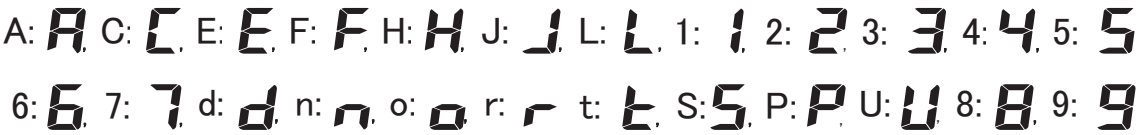
Mode	Code				Description
Operation	C	L			Cooling
	H	t			Heating
			o	r	During oil recovery operation
			d	F	During defrosting operation
			P	C	During power saving operation
			L	n	During low noise operation
			S	n	During setting of snowfall mode

10. 2. Error display mode

Mode	Code				Description
Communication error	E	1	3.	1	Communication error between Outdoor unit
	E	1	4.	1	Outdoor unit network communication 1 error
	E	1	4.	2	Outdoor unit network communication 2 error
	E	1	4.	5	The number of indoor unit shortage
Function setting error	E	2	8.	1	Auto address setting error
	E	2	8.	4	Signal amplifier auto address error
Indoor unit actuator error	E	5	U.	1	Indoor unit error
Outdoor unit PCB/ Electrical component/ Switch error	E	6	1.	5	Outdoor unit reverse phase wire error
	E	6	2.	3	Outdoor unit EEPROM access error
	E	6	2.	6	Inverter communication error
	E	6	2.	8	EEPROM data corrupted error
	E	6	3.	1	Inverter error
	E	6	7.	2	Inverter PCB short interruptions detection
	E	6	8.	1	Magnetic relay error
	E	6	8.	2	Rush current limiting resistor temp rise protection
	E	6	9.	1	Outdoor unit transmission PCB Parallel communication error
Outdoor unit sensor error	E	7	1.	1	Discharge Temp Sensor1 Error
	E	7	1.	2	Discharge Temp Sensor2 Error
	E	7	2.	1	Compressor Temp Sensor1 Error
	E	7	2.	2	Compressor Temp Sensor2 Error
	E	7	3.	3	Outdoor unit Heat Ex. liquid temp. sensor error
	E	7	4.	1	Outdoor Temp Sensor Error
	E	7	5.	1	Suction Gas Temp Sensor Error
	E	7	7.	1	Heat sink temp. sensor error
	E	8	2.	1	Sub-cool Heat Ex. gas inlet temp. sensor error
	E	8	2.	2	Sub-cool Heat Ex. gas outlet temp. sensor error
	E	8	3.	1	Liquid pipe temp. sensor1 error
	E	8	3.	2	Liquid pipe temp. sensor2 error
	E	8	4.	1	Current sensor error
	E	8	6.	1	Discharge pressure sensor error
	E	8	6.	3	Suction pressure sensor error
	E	8	6.	4	High pressure switch 1 error
	E	8	6.	5	High pressure switch 2 error

Mode	Code				Description
Outdoor unit actuator error	E	9	2.	1	Compressor 2 error
	E	9	2.	2	Compressor 2 overcurrent error
	E	9	3.	1	Inverter compressor start up error
	E	9	4.	1	Trip detection
	E	9	5.	5	Compressor motor loss of synchronization
	E	9	7.	1	Outdoor unit fan motor lock error
	E	9	7.	4	Outdoor unit fan motor undervoltage
	E	9	7.	5	Outdoor unit fan motor
	E	9	U.	2	Slave unit error
Refrigerant system abnormal	E	A	1.	1	Discharge temperature 1 abnormal
	E	A	2.	1	Discharge temperature 2 abnormal
	E	A	3.	1	Compressor1 temperature abnormal
	E	A	3.	2	Compressor2 temperature abnormal
	E	A	4.	1	High pressure abnormal
	E	A	4.	2	High pressure protection1
	E	A	4.	3	High pressure protection2
	E	A	5.	1	Low pressure abnormal
	E	A	C.	4	Heat sink temperature abnormal

7 segment LED display:



11. INFORMATION

Main contents of label

Item	Detail
1. Model name	Model name
2. Serial number	Serial number
3. Electric characteristics	Phase, rated voltage, and frequency
4. Weight	Product weight
5. Capacity	Cooling/heating capacity under cooling/heating condition (refer to item 15)
6. Current	Electric current during cooling/heating operation under cooling/heating condition (refer to item 15)
7. Input power	Input during cooling/heating operation under cooling/heating condition (refer to item 15)
8. Max. Current	Maximum electric current (temperature condition is max. cooling condition [refer to item 16])
9. Air circulation	Air circulation
10. Noise level	Noise level
11. Refrigerant	Refrigerant type and initial charging amount
12. Max. pressure (HP/LP)	Means pressure of High Pressure side/Low Pressure side
13. Protection	Protection level against dust and water
14. Working temperature	Working temperature
15. Condition of cooling/heating	Dry-bulb temperature and wet-bulb temperature under standard cooling/heating condition
16. Condition of max. cooling	Dry-bulb temperature and wet-bulb temperature at maximum electric current and input
17. Manufacture year	Manufacture year
18. Origin	Origin country
19. Manufacturer	Manufacturer FUJITSU GENERAL LIMITED Address : 1116, Suenaga, Takatsu-ku, Kawasaki 213-8502, Japan